

Appendix A

Development Statement



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July 7, 2014

VIA HAND DELIVERY

James Snyder
Director of Planning and Zoning City of Falls Church
City Hall
300 Park Avenue
Falls Church, VA 22046

Re: Resubmission Development Site "Broad and West"; Letter of Transmittal and Justification of Application for (1) for Rezoning certain areas of the site to B-1 (2) Special Exceptions for the bulk of the site to allow Mixed Use and for a Building Height Bonus.

Dear Jim:

Venable represents Spectrum Development Company LLC ("Spectrum") which has contracts to purchase or lease the parcels comprising 3.91 acres (more specifically identified in the accompanying partial list) including at 919 Park Avenue, 921 Park Avenue, 925 Park Avenue, 212 N. West Street, 110 N. West Street, 934 W. Broad Street, 932 W. Broad Street 922 W. Broad Street, and 920 W. Broad Street (collectively the "Site").

After the initial application was accepted, the City's representatives asked for a number of modifications to the proposal. Those modifications have been made and a resubmission accompanies this letter. Please note that the rezoning application form and plat is unchanged since the original application called for the entire site to be rezoned to B-1. But the development has changed such that, in summary, there is no longer a pharmacy, no drive thru for the pharmacy, the commercial space is now about 46,000 sf, the hotel has 150 rooms (92,000 sf), and there is a rental residential component of 253 units, a 65 unit residential condominium component (in place of the two detached houses on Park Ave.) Please accept this Transmittal of and Justification for Applications to rezone the residential (R-1B) properties on Park Avenue and the Commercial properties in the site now zoned B-3, to B-1. Also please accept this revised Justification for the special exception and height bonus.

This resubmission has several changes as noted above but also including tapering off the building at West Street and at Park Avenue and other design modifications to make the project meet the goals of the City; the condo units for example, will be set back from Park Ave. 35 feet, will have the appearance of townhouses with front stoops and there will be no vehicular access to Park Ave. Thus while part of this mixed use project, these units will continue to provide low density "feel" to that area of the City.

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As discussed below, the B-1 Zone allows the requested uses. Moreover by rezoning to B-1, automotive uses cannot be located on the site in the future. The City has requested this assurance be provided and so Spectrum requests those portions of the site now zoned B-3 be "downzoned" to B-1.

Spectrum proposes to redevelop the site for a mixed use project.

- A five and six story mixed use (apartment) building with retail and service uses in the ground floor and with about 253 units with 70 percent one bedroom and studios and 30 percent two bedrooms above the ground floor.
- A hotel of five floors with retail and service uses in the ground level and 150 rooms in floors 2 through 6.
- A 65 unit residential condominium facing Park Ave. with no vehicular access on Park and with the appearance of townhouses.
- The ground floor of the apartment building and hotel would have retail uses comprising about 46,000 square feet; such uses will include restaurants, retail shops and service businesses with a mix of local, regional and national brands. A commitment to 25% food and beverage uses is provided in a Proffer.
- Such improvements to the existing parkland along the W& OD trail that will provide a connection to the transit and recreational opportunities of the Trail; subject to the approval of the Northern Virginia Regional Park Authority.

The site is located in planning opportunity area three and the site is discussed in the Comprehensive Plan at pages 58 and 59. The redevelopment area calls for mixed uses diagonally across from the site but in fact that area is committed in the long term to retail uses.

By consolidating the parcels in this site, Spectrum has achieved a number of the Goals in the City's Comprehensive Plan. Specifically, the proposed mixed use development provides for sustainable development as it will allow for improvements to storm water management, to energy efficiency, to parks and open space, to locating residents nearer to employment, transit and shopping areas, enhances the integrity of the low density residential area by establishing for the long term a "terminus" to the residential area of Park Avenue. The internal and external improvements to traffic movement will greatly improve the current difficult intersection of West Street and Park Avenue (See pages 75Rv through 76Rv of the Comprehensive Plan).

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Demographic and market trends demonstrate that the future development in this area should be an innovative and integrated approach to a mixture of uses including retail, hospitality, residential and service uses.

Spectrum expects that given the increasing mass of retail, and newer, smaller multi-family units, the surrounding area will become more attractive to office users and other retailers as well.

Additionally, Spectrum requests the approval of special exceptions to allow for a mixed use development to include multi-family rental units and for a bonus of 30 feet in height.

The Staff will provide the fiscal impact analysis; we expect the net impact to be about \$2m.

These requests are summarized in the attached document entitled: The Spectrum Development / Parcel Ownership. Concurrently, Spectrum is requesting a change in the Comprehensive Plan Future Land Use Map for certain areas of the site to be shown as mixed use rather than business. While the resubmission replaces the originally planned two detached houses on Park with a small condominium, the building will have a townhouse appearing façade with all lower level units having "stoops" providing access to Park; there will be no vehicular access of the condo to Park which will reduce the traffic that the two detached houses would present and which provides on street parking for neighbors. Thus the "feel" and actual use of that area remains low residential although it is part of the mixed use project.

Spectrum and its development team have had extensive discussions with The City Council and Planning Commissions in public work-sessions and with stakeholders in the community, elected and appointed official and staff members. The central concerns have been the following:

1. There should be a substantial commercial component for this large site, and a considerable positive fiscal impact for the City of Falls Church is a primary goal.
2. Density should be increased and a quality hotel should be brought to the project to assist in achieving the desired positive fiscal impact.
3. Traffic is a great concern given, among other things, the unusual configuration of West and Park Ave and the need to control access on West Broad Street and West Street.



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4. The buildings should have superior architecture and layout with tapering toward Park Ave and the greatest height and massing along West Broad with a superior focal point at West and West Broad.
5. Some local retailers should be encouraged to stay in the project.
6. Parks and open space needs should be addressed in part by linking the site to the W& OD Trail.
7. The apartment and condominium buildings should be LEED Certified Silver.
8. Storm water management for the site and the immediate area should be improved.
9. Streetscape should be tailored to the site and also consistent with (but not necessarily the same) the City's existing streetscape standards.
10. There will be no anchor pharmacy or drive thru.
11. The frontage along Park Avenue should take the opportunity to make an appropriate transition to the development and solidify for the long term the low residential density of that terminus of Park Avenue.
12. Aerial utilities on the site will be placed underground.
13. This redevelopment opportunity involves a large consolidation of ten separate parcels in the West Broad Street Area, and if redevelopment fails to go forward for any cause, then the existing auto and light industrial uses on some of the parcels will remain for a long indefinite period of time before another redevelopment opportunity may arise.

A note about 920 West Broad Street is useful here. That parcel was the location of a house that was listed on the City's Historic Register when the Register was created in the mid 1980's. The owner (Lillian Henderson) applied for and was granted by the City's Historic Review Board, the right to raze the house. The property was then sold but the new owner chose instead to incorporate a piece of that structure into a small commercial building. There is no expiration date applicable to the approval of the right to raze the structure and while the structure was not "removed" from the register, there is no requirement to seek a new approval to raze the structure. This approach is identical to that followed by the City for the protected structure at the Murphy's Funeral Home, which was razed 10 years after the HRB's approval when the site was redeveloped for "Northgate." While the Zoning Administration determined otherwise, that decision is being appended to the BZA. The developer is submitting a demolition request to the HARB concurrent with its BZA appeal.

THE PROPOSED DEVELOPMENT AND ITS COMMUNITY BENEFITS

Spectrum proposes to redevelop the site as a revised use project. The existing three detached houses on Park Avenue will be replaced with two detached houses. This will be consistent with the current land use designation of low residential and will provide stability to

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that low density residential neighborhood. These two dwellings will provide an excellent transition of uses and tapering of height and mass to the apartment building to the South. The remainder of the site will be developed as follows:

- A five/six story mixed use (apartment) building with retail and service uses in the ground floor and with about 253 rental units with 70 percent being one bedroom and studios and 30 percent two bedrooms. A condominium is proposed with 65 units.
- A hotel of five floors with retail and service uses in the ground floor and 150 hotel rooms in floors 2 through 6.
- The ground floor of the apartment building would have retail uses comprising about 46,000 square feet; such uses would include a movie/dinner theater, restaurants, retail shops and service businesses with a mix of local, regional and national brands.
- Such improvements to the existing parkland along the W& OD trail that will provide a connection to the transit and recreational opportunities of The Trail; subject to the approval of the Northern Virginia Regional Park Authority.
- The expected contributions to the Schools Capital program of about \$7500 per market rate rental units will be met.
- A commitment of about six percent of the total of the rental and for sale units (70% one bedroom and 30% two bedroom) being set aside as Affordable Housing Units in the Rental component and equally allocated among households at 60%, 80% and 100% of the median household income.
- Net tax revenue increases of approximately \$2m annually are expected based on the City's economic projections.
- The traffic in and around the area will be better managed with traffic calming added and improvements added to the larger street grid around the project.

The site is located in planning opportunity area three and the site is discussed in the Comprehensive Plan at pages 58 and 59. The redevelopment area calls for mixed uses diagonally across from the site but in fact that area is committed in the long term to retail uses.

By consolidating the parcels in this site, Spectrum has achieved a number of the Goals in the City's Comprehensive Plan. Specifically, the proposed mixed use development provides for sustainable development as it will allow for improvements to storm water management, to energy efficiency, to parks and open space, to locating residents nearer to employment, transit and shopping areas, enhances the integrity of the low density residential area by establishing



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for the long term a “terminus” to the residential area of Park Avenue. The internal and external improvements to traffic movement will greatly improve the current difficult intersection of West Street and Park Avenue (See pages 75Rv through 76Rv of the Comprehensive Plan. The number of access points on Broad, West and Park are being reduced from eleven to four.

Demographic and market trends demonstrate that the future development in this area should be an innovative and integrated approach to a mixture of uses including retail, hospitality, residential and service uses.

Spectrum expects that given the increasing mass of retail, and newer, smaller multi-family units, the surrounding area will become more attractive to additional pedestrian oriented shopping and office users as well. The once in a generation parcel consolidation achieved by Spectrum provides the City with the opportunity to address all of the issues outlined above. Without the approvals requested, the properties will continue with their current uses for the indefinite future.

TRAFFIC IMPACT

Wells & Associates has reviewed the revisions to the uses. A letter from Wells is provided in the package of materials.

SPECIAL EXCEPTION CRITERIA FOR MIXED-USE AND HEIGHT BONUS

1. Primary Criteria (Section 48-90(1)):

- a. The resulting development conforms to the City's adopted Comprehensive Plan and Design Guidelines (Section 48-90(1) (a)).

The Comprehensive Plan shows that the property is located in Planning Opportunity Area 3, and the proposed development meets or exceeds the strategies called for in that area:

1. Consolidation of lots to accommodate higher density.
2. Promotion of redevelopment that eliminates stand-alone automobile and light industrial facilities.
3. Improve pedestrian accessibility with controlled cross walks at various locations.

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4. Create a consistent design, in terms of building height and design, streetscape improvements, and other aspects of the built environment in the City.
5. Preserve recreational resources in the area.
6. Create development to promote a positive image of the City in an area that has not seen any significant new development in decades.
7. Locate buildings as close to West Broad and West Streets as possible with parking located in the rear or in shared buildings or in structured facilities (in this case covered, surface and underground).
8. Achieve consistent architectural goals.
9. Traffic turn lanes will be added to Broad and West Streets.

Additionally, the Comprehensive Plan's Future Land Use Map designates the property as "business". The text of the comprehensive plan currently points out that while this means the area should be "primarily" recognized as retail or office districts rather than residential, "special exceptions for residential use and height bonuses have also been granted to create mixed use projects in 'business' areas since 2002".

The Comprehensive Plan should be changed to reflect current practice, the City's goals and the changing environment. To do this, an application to change the Comprehensive Plan's designation from Business to "Mixed Use" has been submitted to the City.

The Design Guidelines show that the property is located in the West Broad Street Area. As called for in the Guidelines, the proposed development will reflect an urban street front, will provide a consistent identity for the area, increase pedestrian activity, and indicate the high standards of the City. In addition, the proposed development will widen paving at crosswalks, provide a mini-park at the W&OD trail, all of which will work to increase pedestrian and bicycle activity in the area. The site's proximity offers a unique opportunity to finally provide superior connection to the W&OD Trail. The best use to optimize that linkage is mixed use and not office or light industrial uses.

- b. The resulting development provides for significant net new commercial square footage and allows for a mix of commercial and residential uses (Section 48-90(1)(b)).

Currently, the properties in the site contribute only minimally in tax revenue. All existing properties are served by significant surface parking. The proposed development will remove these largely automobile-oriented and light industrial uses, providing significant net new commercial square footage and allowing for a mix of



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commercial and residential uses. The proposed development as noted provides substantial new commercial space (more specifically described in the Table in the Concept plan), and uses language desired by the City.

c. The resulting development produces substantial positive net new commercial and residential revenue to the City (Section 48-90(1) (c)).

In conjunction with this application, information has been submitted to the City to be inputted into the City's cost/revenue impact model to predict the project's net new revenue, and a report has been received, which is attached separately. As recognized by the Comprehensive Plan, the parcels that make up the property are underutilized currently in terms of their density and use. The proposed development will significantly increase the assessed value of and resultant property tax revenue generated by the property. In addition, by creating a vibrant, attractive western gateway into the City, the development will encourage additional consumers to enter the area and patronize commercial uses throughout the City.

2. Secondary Criteria (Section 48-90(2))

a. The development is not disproportionate to surrounding land uses and planned land uses in size, bulk or scale (Section 48-90(2) (a)).

The proposed development is a concrete podium of commercial uses with five floors of multi-family and hotel above, with a total height of about 85 feet. The development has the unique aspect of substantial at grade parking for the retail uses hidden behind the retail and under the residences. The exterior is masonry, and the building is fully consistent with high standards established by the City for prior mixed use projects.

The area of the footprint of this project is "low" and the height of the new building will blend well with its environment and set the stage for future development. Given the high-quality design and construction of the building and its prominent place in the City, a building of this scale is appropriate. The proposed development works in conjunction with existing buildings to further create a dramatic, defined statement of quality for this area of the City. The development is consistent with the discussion in the Comprehensive Plan for this Redevelopment Opportunity Area which calls for significant mixed (multifamily) uses-the area called for this Plan however is committed long term to other uses that conflict with the Plan.

b. The resulting development does not overburden the existing community facilities, including the school, transportation and water and sewer systems (Section 48-90(2) (b)).

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Transportation

A traffic study has been conducted by Wells and Associates that evaluates the anticipated traffic impacts of the application and provides specific recommendations to mitigate those impacts. That Study has been provided to the Staff. Some revisions to counts will be made to reflect the changes in the retail plan for the site. The application envisions a vibrant mixed-use development that will be sensitive to the transportation concerns of the City. By providing a variety of complementary uses on the same site, the proposed development will encourage self-contained, pedestrian trips. Additionally, due to its location proximate to several bus routes including a future intermodal transportation center and with implementation of Transportation Demand Management ("TDM") measures, a percentage of the trips generated by the residential and commercial components of the proposed development are anticipated to utilize non-auto modes of transportation. TDM measures will include convenient bicycle storage facilities, transit incentives, and resources conducive to teleworking. Furthermore, the developer proposes to reconfigure of the intersection at West Street and Park Avenue and add lane changes and traffic calming.

Water & Sewer

The City's utility engineer has confirmed that water and sewer service is adequate. The project will greatly improve storm water management with BMPs as the existing development has virtually no storm water management measures.

c. The resulting development provides community benefits such as affordable housing, as it is described in Section 38-43 (Section 48-90(2) (c)).

The developer is proposing an Affordable Dwelling Unit contribution in keeping with similar mixed use developments contributions, with about 6% (a total of 19 units all of which will be in the rental residential component of the project) of the total units (rental and condominium) being contributed as Affordable Housing Units and equally allocated among households at 60%, 80% and 100% of the median household income.

A commitment to LEED Silver for the Apartment and condominium building is provided, and the developer will underground all aerial utilities contiguous to the site depending on costs and availability of easements. The developer proposes to review this in detail with the City to determine what poles can be undergrounded in the immediate area.

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- d. The resulting development contributes to a vibrant, pedestrian-oriented environment both on site and in relation to adjoining properties, with street level activity throughout the day and evening (Section 48-90(2) (d)).**

The current uses at the site are distinctly automobile-oriented, with the majority of the property occupied by their own surface parking lots. The proposed development will move almost all parking within enclosed structures, which will contribute further to the walkable nature of the area.

- The provision of streetscape along the entire development's three sides facing streets will contribute to the vibrant, pedestrian-oriented environment with connectivity to adjacent commercial and park areas. The mix of uses, including restaurants, retail, and other commercial opportunities will provide a balanced commercial center that will generate pedestrian traffic throughout the day and evening. The street level retail uses will be very visible and will encourage customers to enter the area to shop and visit not only this development, but the additional retail located nearby.

- e. The resulting development offers creative use of landscaping, open space and/or parks, public plazas or and walkways connecting to adjoining properties (Section 48-90(2) (e)).**

Three sides of the proposed building will have the attractive "streetscape" design and fixtures, and there will be enhanced connections around the site to nearby businesses, parks, and residences. A "mini park" is planned along W&OD trail, and this amenity will invite pedestrians to ride bikes, rest, talk, sit, eat and simply enjoy the area which includes the soon to be completed West End Park. This depends upon approval of the NVRPA.

A cash contribution is provided. Further, a cash contribution is possible to facilitate the completion of the West End Park.

- f. The resulting development provides a variety of commercial services and uses that are attractive to and meet the needs of all city residents for entertainment, art, recreation, dining retail and array of consumable goods (Section 48-90(2)(f)).**

As stated above, the proposed development envisions a hotel as well as a mix of commercial uses. This includes a movie/dinner theater, and retail opportunities in an area that is lacking sufficient quality retail currently. These commercial entities will

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serve the residential uses within the proposed development, as well as the neighborhood as a whole.

g. The resulting development encourages local or independent businesses (Section 48-90(2) (g)).

The retail and restaurant space provide a unique opportunity for local, regional and independent businesses, and the high-quality development will help the area as a whole attract and cultivate local and independent businesses. The smaller retail spaces in the development provides excellent opportunities for local "mom and pop" and incubator businesses.

h. The resulting development provides for a reduction of single use parking requirements through shared parking Section 48-90(2) (h)).

As shown in the submitted conceptual plan, the developer is recommending shared parking. The developer will explore with the final parking provided with the City to determine any additional parking reductions are justified based on the characteristics of the property and its proximity to bike ways, as well as several bus lines, will lead to fewer automobile trips. Additionally, a private shuttle to the nearest metro rail station is being considered for residents and hotel guests and it is expected that some residents will bike to work (or to a multi-modal transit location for switching to bus or rail), and that the commercial uses will be patronized at least in part by pedestrians and cyclists.

i. The resulting development encourages multi-modal transportation through design and other techniques to reduce the reliance on single occupancy vehicles, and utilizes sheltered stops for mass transit whenever feasible Section 48-90(2) (i)).

As discussed, the property is in close proximity to existing bike ways, as well as the Metro Rail station and several bus lines. It is expected that some residents will walk to the Metro Rail station and others will bike to work, and that the commercial uses will be patronized at least in part by pedestrians and cyclists. The design includes attractive and user friendly places for bikes to be parked and stored.

j. The resulting development utilizes LEED criteria in the design of the project Section 48-90(2) (j)).

The proposed apartment and condominium development is planned to be LEED Silver certified, and will otherwise be designed using green design principles and elements. By removing the existing imperious parking lots and implementing a new storm water management plan, the development will greatly reduce storm water runoff in the area.



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Additionally, the non-residential part of the project will incorporate eco-conscious sustainable elements in the design of the hotel and other commercial spaces.

Special Exception for Height Bonus.

The area of the site to be used for the mixed use project is currently zoned B-3 and B-1, which permit a by-right height of up to 55 feet. The developer proposes the requested development to be a maximum height of 85 feet.

Up to 30 feet of bonus height may be granted if the project is exemplary in terms of conformance to the Primary Criteria 1 and 2 set out above and assists in conformance with Primary Criteria 2 and 3. The amount of new commercial area is more than three times the area of the existing commercial activity. More importantly, the new commercial activity replaces commercial uses which are discouraged by the City's Comprehensive Plan. The net new commercial and retail income is far greater than that of the existing uses and far superior in terms of making the area a desirable place to live, work, and play. Many of the difficult to achieve goals of the Comprehensive Plan will be met by the proposed development. For these reasons, this plan is exemplary in its achievement of the primary criteria set out above.

Bonus height may be awarded for certain preferred uses when located on primary street frontage. These uses include outdoor dining, hotel and other uses specifically requested by the City. This development proposes improvements to the W&OD park, a hotel, a new movie/dinner theater, multiple retail opportunities and outdoor dining and some restaurants possibly with entertainment; all of which are considered preferred uses, justifying a bonus height of 30 feet.

It is important to note here that the first floor retail uses require a ceiling heights ranging from 15 to 24 feet, and that this required ceiling height is a major reason why the bonus is needed. As discussed, the design of this project, and in particular its height, is an exceptional new addition to this part of the City. The project sets a high bar for quality in terms of design, use, and materials, and if the proposed project were to be lowered by 30 feet, the integrity of the design would be greatly compromised, likely making the development infeasible.

The location and unique physical characteristics of the site make the requested building height appropriate. The property is located in an area that is expected to attract similar developments which will likely reach heights of 85', so that the requested height of 85' in certain locations is not out of the character of the surrounding neighborhood and the expected area as it evolves.

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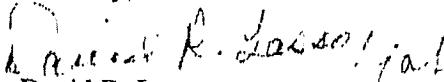
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CONCLUSION

The Spectrum redevelopment at Broad and West fully reflects the City's vision for that area of Falls Church. The project meets or exceeds the primary and secondary criteria used to evaluate the merits of the special exceptions. Therefore, the requested special exceptions for residential use and height bonus at the City's gateway should be granted.

Thank you and the City Staff for its guidance and attentiveness to this project.

Sincerely,


David R. Lasso

Enclosures

Appendix B

Scoping Document and Correspondence



CITY OF FALLS CHURCH

TO: Will Johnson, Wells+Associates, Inc.

FROM: Kirsten Munz, P.E. – Civil Engineer, DPW

SUBJECT: N. West & West Broad Site (“Shreve Corner” development)
TIA Scoping Approval

DATE: September 18, 2013

On August 15, 2013 a scoping meeting was held to discuss the conceptual development of a mixed-use project located at the corner of North West Street, West Broad Street and Park Avenue in the City of Falls Church. The applicant’s pre-scoping form was discussed to determine the parameters of a TIA for the subject project. Subsequent to the meeting, the applicant revised the pre-scoping form based on the discussion.

The City approves the scoping parameters outlined in the updated scoping form, received August 16, 2013 with the following points of clarification and emphasis:

- The project’s proximity to the W&OD trail should be of utmost consideration. All design elements should be driven by the goal to facilitate safe, convenient and efficient travel for a mixture of transportation modes.
- NVRPA has conducted a preliminary redesign of the W&OD trail crossing on North West Street to improve safety, which was provided to the applicant. The applicant has agreed to consider incorporating this element into the intersection redesign. The applicant is advised to coordinate any changes within the NVRPA right-of-way closely with the Park Authority.
- Analysis of access point on West Broad shall also include an option for right-in/right-out only access.
- If a new signal is pursued at the access point on West Broad, a full MUTCD signal warrant analysis must be conducted prior to SE approval, to adequately understand its merits and impacts.
- In addition to a roundabout at North West/ Park Avenue, alternative designs shall be explored and analyzed.
- A transportation demand management plan (TDM) shall include specific, quantifiable measures, accompanied by justification based on numerical data.
- Sight distance analyses at all intersections shall be based on AASHTO standards. Sight distances for bicycles, particularly in the vicinity of the W&OD trail, shall be analyzed as well.

- Geometric design shall accommodate school bus turning movements.
- The applicant is advised to examine the feasibility of providing a pedestrian route mid-block along the east edge of the site, connecting East Broad to Park Avenue.



PRE-SCOPE OF WORK MEETING FORM

Information on the Project Traffic Impact Analysis Base Assumptions

The applicant is responsible for entering the relevant information and submitting the form to VDOT and the locality no less than three (3) business days prior to the meeting. If a form is not received by this deadline, the scope of work meeting may be postponed.

Contact Information

Consultant Name: Tele: E-mail:	William F. Johnson – Wells+Associates, Inc. 703-365-9262 wfjohnson@mjwells.com
Developer/Owner Name: Tele: E-mail:	Peter A. Batten – Spectrum Development LLC 202.607.3952 pbatten@spectrumdevelop.com

Project Information

Project Name:	N West Street and W Broad Street		Locality/County:	City of Falls Church
Project Location: (Attach regional and site specific location map)	The subject site is located located north of W Broad Street (Route 7), south of Park Avenue and east of N West Street in the City of Falls Church, Virginia. See Attachment I for the site location.			
Submission Type	Comp Plan <input checked="" type="checkbox"/>	Rezoning <input checked="" type="checkbox"/>	Site Plan <input checked="" type="checkbox"/>	Subd Plat <input type="checkbox"/>
Project Description: (Including details on the land use, acreage, phasing, access location, etc. Attach additional sheet if necessary)	<p>The subject properties are zoned B-3 (General Business), B-1 (Limited Business), and R-1B (Medium Density Residential). The properties are currently developed with a variety of commercial, office, and residential uses. The applicant proposes to raze the existing uses and subsequently redevelop these properties with a mix of residential, retail, and office and/or hotel components as shown in Attachment II (footnote 1). Access to the project is proposed on West Street, Broad Street, and Park Avenue. On N West Street, a right-in/right-out access would be located approximately 175 feet north of the W Broad Street/N West Street intersection. Two entrances are proposed on W Broad Street with the westernmost access restricted to right-in/right-out movements only. Lastly, an access is also provided on Park Avenue (see Attachment II).</p> <p>Footnote 1: About half of the area currently zoned R-1B will be rezoned to B-1 (22,353 GSF) and the remaining three R-1B building lots reduced to two. Six parcels zoned B-3 will be downzoned to B-1 (92,031 GSF). The area devoted to mixed use (148,135 GSF) will have its comprehensive plan designation changed from "Business" to "Mixed Use" and the approximately 22,353 GSF of R1-B from "Low Density Residential" to "Mixed Use".</p>			
Proposed Use(s): (Check all that apply; attach additional pages as necessary)	Residential <input type="checkbox"/>	Commercial <input type="checkbox"/>	Mixed Use <input checked="" type="checkbox"/>	Other <input type="checkbox"/>

It is important for the applicant to provide sufficient information to county and VDOT staff so that questions regarding geographic scope, alternate methodology, or other issues can be answered at the scoping meeting.

	Residential Uses(s) Number of Units: ITE LU Code(s):	274 multifamily dwelling units, 2 single family detached dwelling units 220 210 —	3,000 GSF bank 14,800 GSF pharmacy up to 26,420 GSF other retail uses
	Commercial Use(s) ITE LU Code(s):	912 881 826 Square Ft or Other Variable:	Other Use(s) ITE LU Code(s): 310 OR 710 Independent Variable(s): 149 hotel rooms OR 40,044 GSF office uses (See Attachment III for a preliminary trip generation analysis)

Total Peak Hour Trip Projection:	Less than 100 <input type="checkbox"/>	100 – 499 <input type="checkbox"/>	500 – 999 <input type="checkbox"/>	1,000 or more <input checked="" type="checkbox"/>
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Traffic Impact Analysis Assumptions

Study Period	Existing Year: 2013	Build-out Year: 2019	Design Year: 2019
Study Area Boundaries (Attach map)	North: Lincoln Avenue (Route 6774)	South: W Broad Street (Route 7)	
	East: N Spring Street	West: N West Street (Route 6749)	
External Factors That Could Affect Project (Planned road improvements, other nearby developments)	Any approved and/or proposed pipeline development projects as well as potential external factors will be discussed with City staff.		
Consistency With Comprehensive Plan (Land use, transportation plan)	The subject parcels are planned for Business and Low Density Residential uses in the City's Future Land Use Plan Map. The applicant plans to redevelop the site in a manner that is in harmony with the City's Comprehensive Plan.		
Available Traffic Data (Historical, forecasts)	<p>The traffic analysis will utilize the most recent VDOT traffic data as needed and the counts conducted by Wells+Associates, and/or counts from any other sources as agreed to with staff.</p> <p>2012 VDOT Traffic Data:</p> <p>W Broad Street (Route 7) – 29,000 vehicles per day (vpd)</p> <p>N West Street (Route 6749) – 5,800 vpd</p> <p>Lincoln Avenue (Route 6774) – 2,700 vpd</p>		
Trip Distribution	Road Name: 35% to/from west on W Broad Street	Road Name: 35% to/from east on W Broad Street	

It is important for the applicant to provide sufficient information to county and VDOT staff so that questions regarding geographic scope, alternate methodology, or other issues can be answered at the scoping meeting.

(Attach sketch)	Road Name: 8% to/from north on N West Street Road Name: 2% to/from north on Grove Avenue	Road Name: 12% to/from east on Park Avenue Road Name: 8% to/from south on S West Street (See Attachment IV)
Annual Vehicle Trip Growth Rate:	1.0%	Peak Period for Study (check all that apply)
		<input checked="" type="checkbox"/> AM <input checked="" type="checkbox"/> PM <input type="checkbox"/> SAT
Study Intersections and/or Road Segments (Attach additional sheets as necessary)	Peak Hour of the Generator See Attachment III	
	1.W Broad Street/West Street	6.N West Street/Lincoln Avenue
	2.N West Street/Grove Avenue	7.Grove Avenue/W&OD Trail (including pedestrian/bicycle movements)
	3.N West Street/Park Avenue	8.N West Street/W&OD Trail (including pedestrian/bicycle movements)
	4.W Broad Street/Spring Street	9.All Future Site Entrances
	5.Park Avenue/N Spring Street	10.(See Attachment IV)
Trip Adjustment Factors	Internal allowance: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Reduction: 5/10/15 for AM/PM/Saturday capture of retail/residential % trips	Pass-by allowance: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Reduction: 25 (non-residential)% trips
Software Methodology	<input checked="" type="checkbox"/> Synchro <input type="checkbox"/> HCS (v.2000/+) <input type="checkbox"/> aaSIDRA <input type="checkbox"/> CORSIM <input type="checkbox"/> Other _____	
Traffic Signal Proposed or Affected (Analysis software to be used, progression speed, cycle length)	<ol style="list-style-type: none"> 1. Synchro 7.0 will be used to conduct the capacity analysis. 2. Existing analysis will include Peak Hour Factor's from the existing traffic counts by approach. 3. A minimum PHF of 0.85 will be used under existing conditions. 4. Background and Total Future analysis will utilize a default PHF of 0.92. <p>A table containing generalized Synchro parameters is included as Attachment V. These parameters will be used, as may be appropriate.</p>	
Improvement(s) Assumed or to be Considered	<ol style="list-style-type: none"> A. Any assumed improvements/recommendations would be based on the results of the capacity analysis. B. Potential Transportation Demand Management (TDM) measures will be evaluated and included in the report. Additionally, enhancements to the pedestrian/bicycle network, as may be appropriate, will be investigated. C. Demonstration of adequate sight distance will be included in engineering drawings. 	
Background Traffic Studies Considered		

It is important for the applicant to provide sufficient information to county and VDOT staff so that questions regarding geographic scope, alternate methodology, or other issues can be answered at the scoping meeting.

Plan Submission	<input type="checkbox"/> Master Development Plan (MDP) <input checked="" type="checkbox"/> Generalized Development Plan (GDP) <input type="checkbox"/> Preliminary/Sketch Plan <input type="checkbox"/> Other Plan type (Final Site, Subd. Plan)
Additional Issues to be Addressed	<input checked="" type="checkbox"/> Queuing analysis <input type="checkbox"/> Actuation/Coordination <input type="checkbox"/> Weaving analysis <input type="checkbox"/> Merge analysis <input checked="" type="checkbox"/> Bike/Ped Accommodations <input type="checkbox"/> Intersection(s) <input checked="" type="checkbox"/> TDM Measures <input type="checkbox"/> Other _____

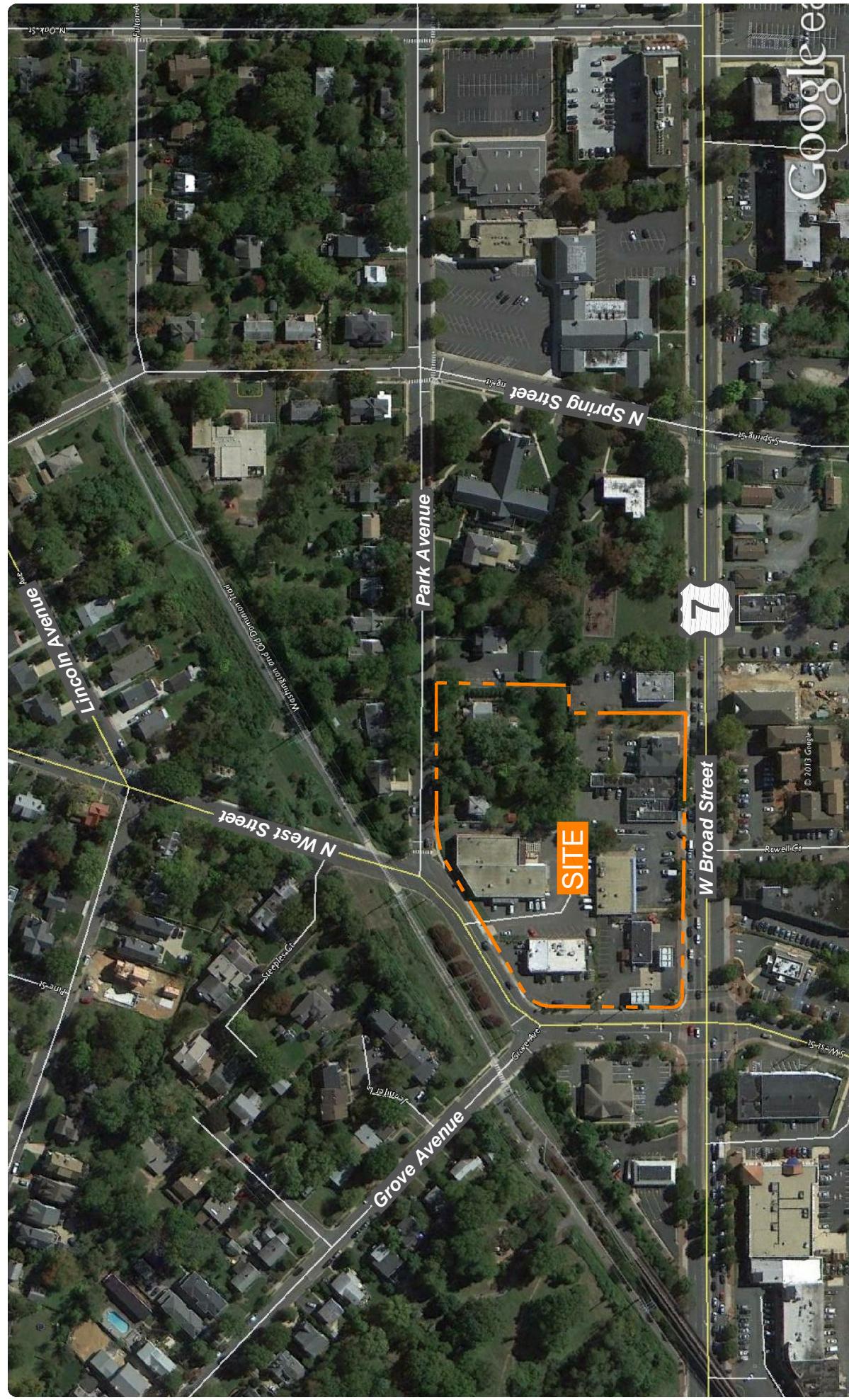
NOTES on ASSUMPTIONS: 1. Synchro 7.0 will be used to conduct the capacity analysis with a minimum PHF of 0.85; all other movements for existing conditions would be field measured PHFs. Background and Total Future analysis shall use a PHF of 0.92.

2. The percent heavy vehicles (%HV) will be based on the traffic counts or a default 2%, whichever is higher.
3. A maximum non-auto/transit reduction of 5% for residential generated trips will be applied, consistent with other area studies.

SIGNED: _____ DATE: _____
 Applicant or Consultant

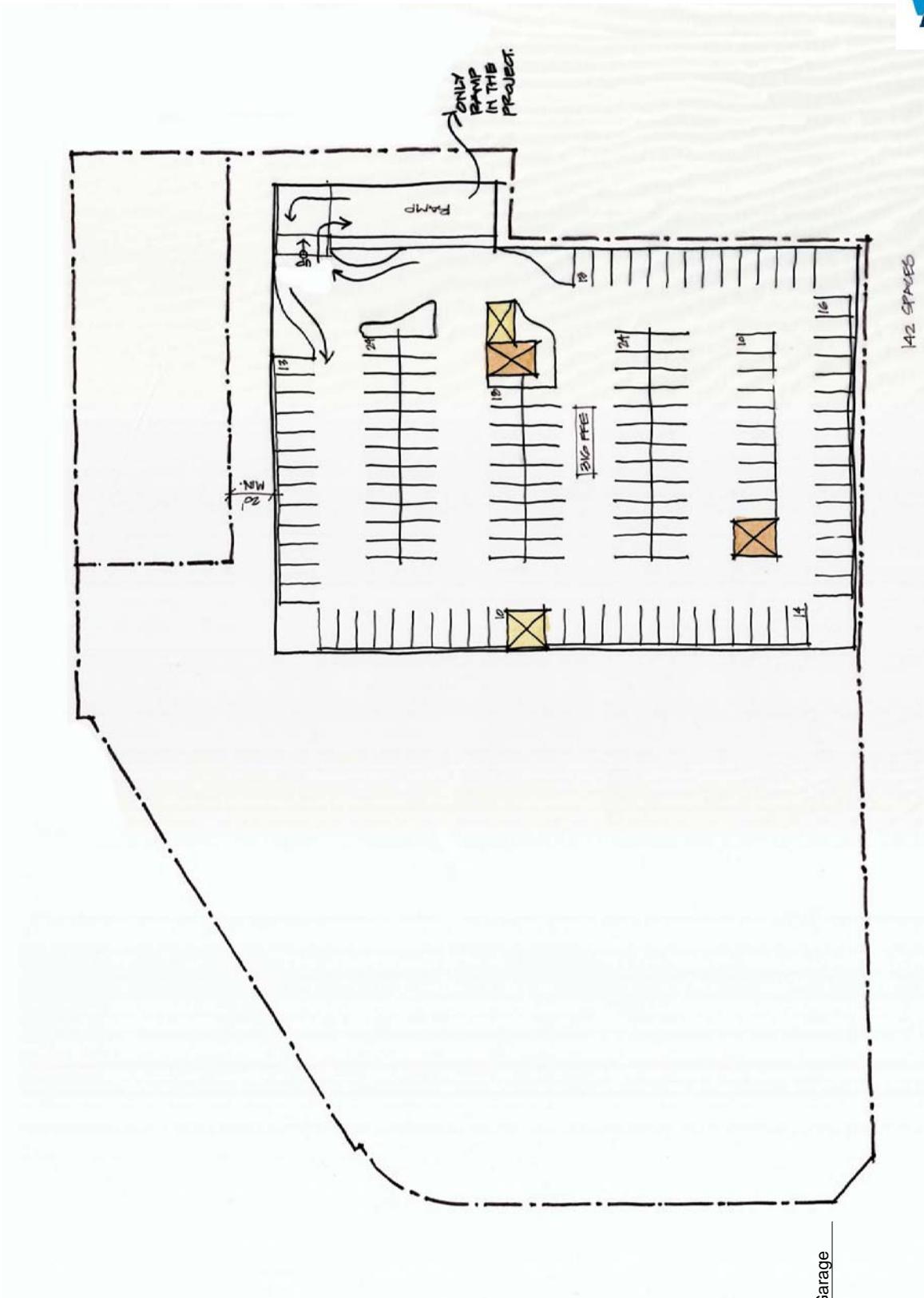
PRINT NAME: _____
 Applicant or Consultant

It is important for the applicant to provide sufficient information to county and VDOT staff so that questions regarding geographic scope, alternate methodology, or other issues can be answered at the scoping meeting.



Attachment I
Site Location

North



① Sketch of Lower Garage
N.T.S.

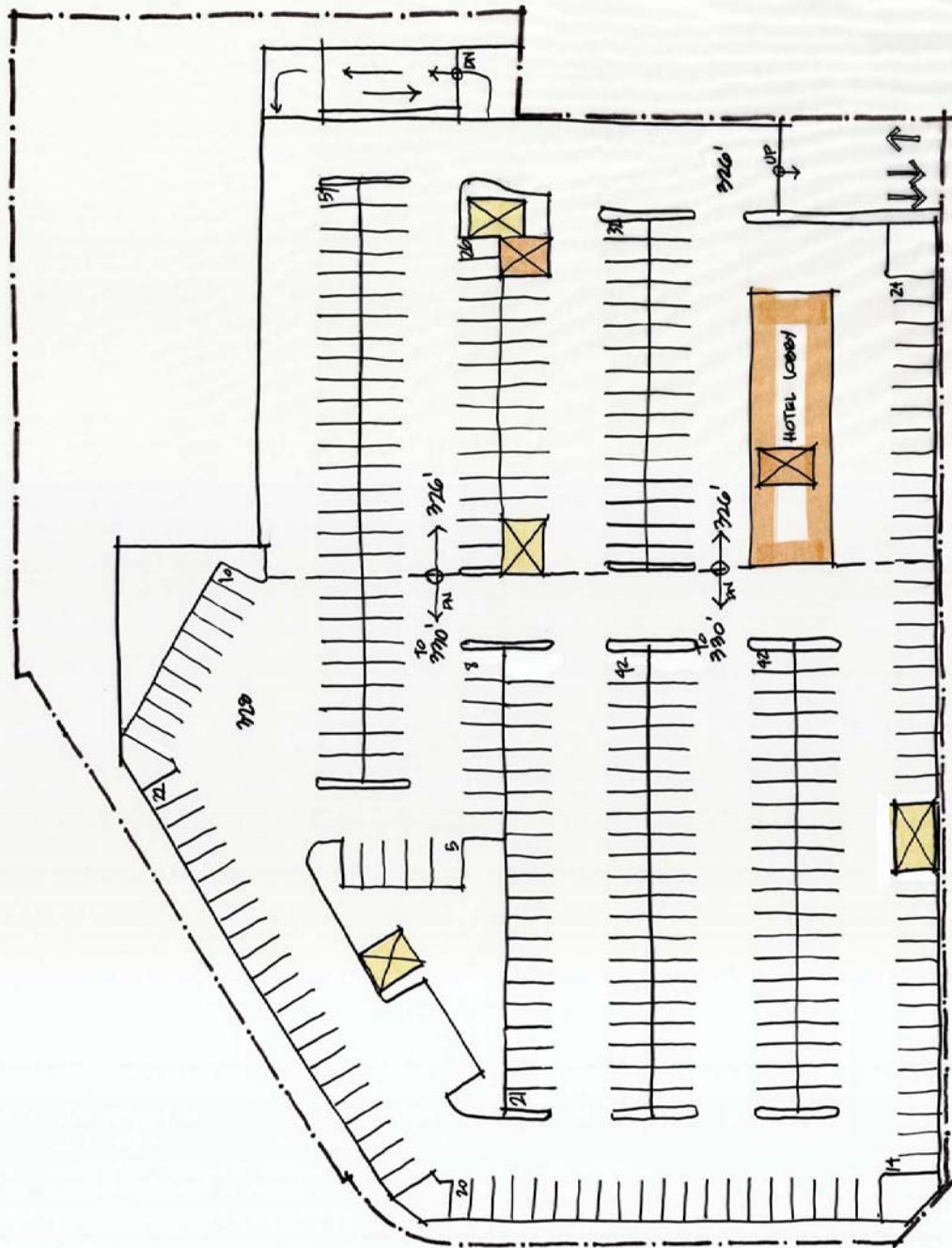
43

Lower Garage Sketch - FFE
Spectrum | WEST & BROAD | Massing Study

ATTACHMENT II

N West & W Broad Street

08/05/13



① Sketch of Upper Garage
N.T.S.

44

Upper Garage Sketch - FFE

Spectrum | WEST & BROAD | Massing Study

ATTACHMENT II

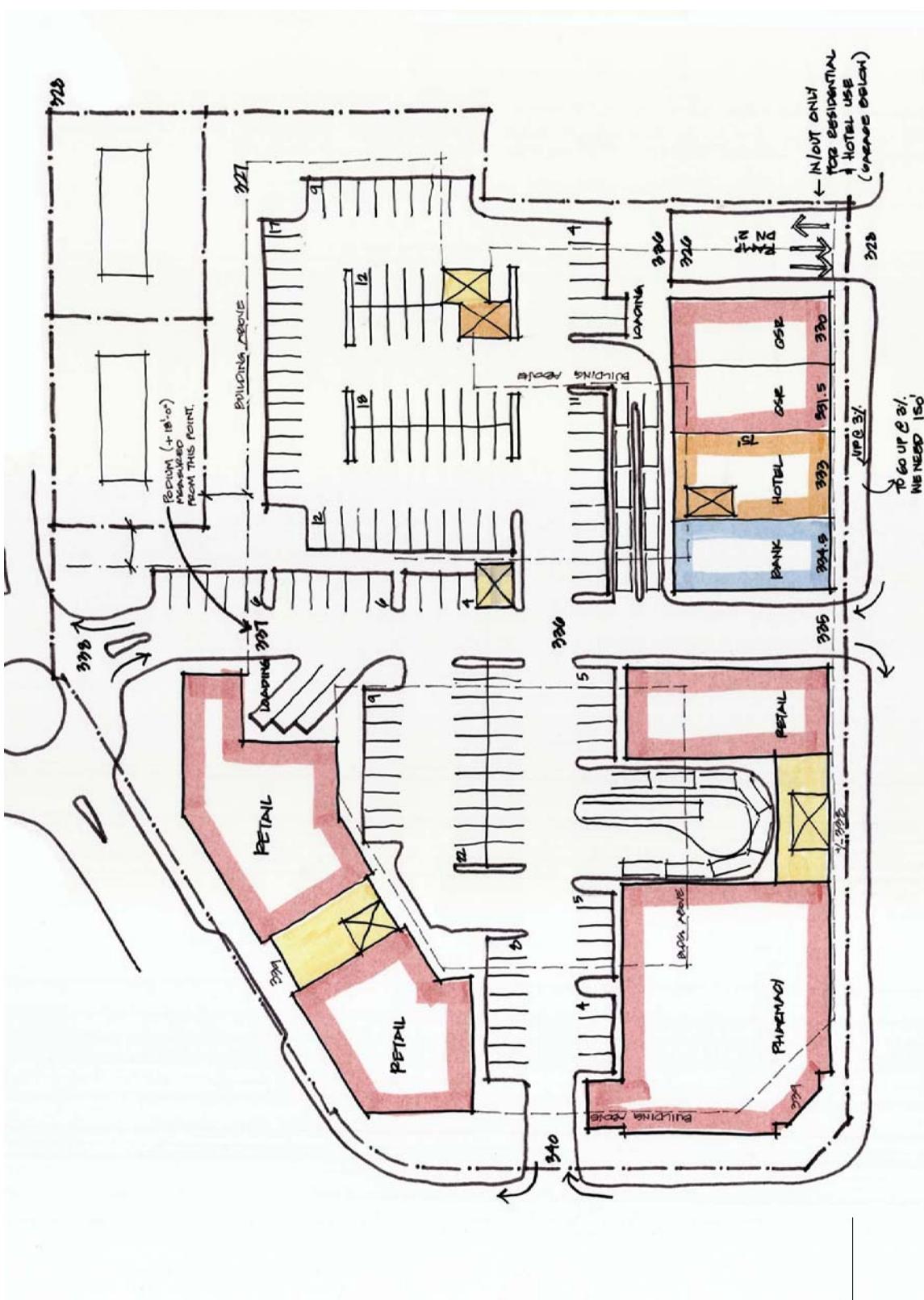
N West & W Broad Street

08/05/13

streetsense.



streetsense.com



45

First Floor Sketch - FFE

Spectrum | WEST & BROAD | Massing Study

ATTACHMENT II

① Sketch of 1st Floor
N.T.S.

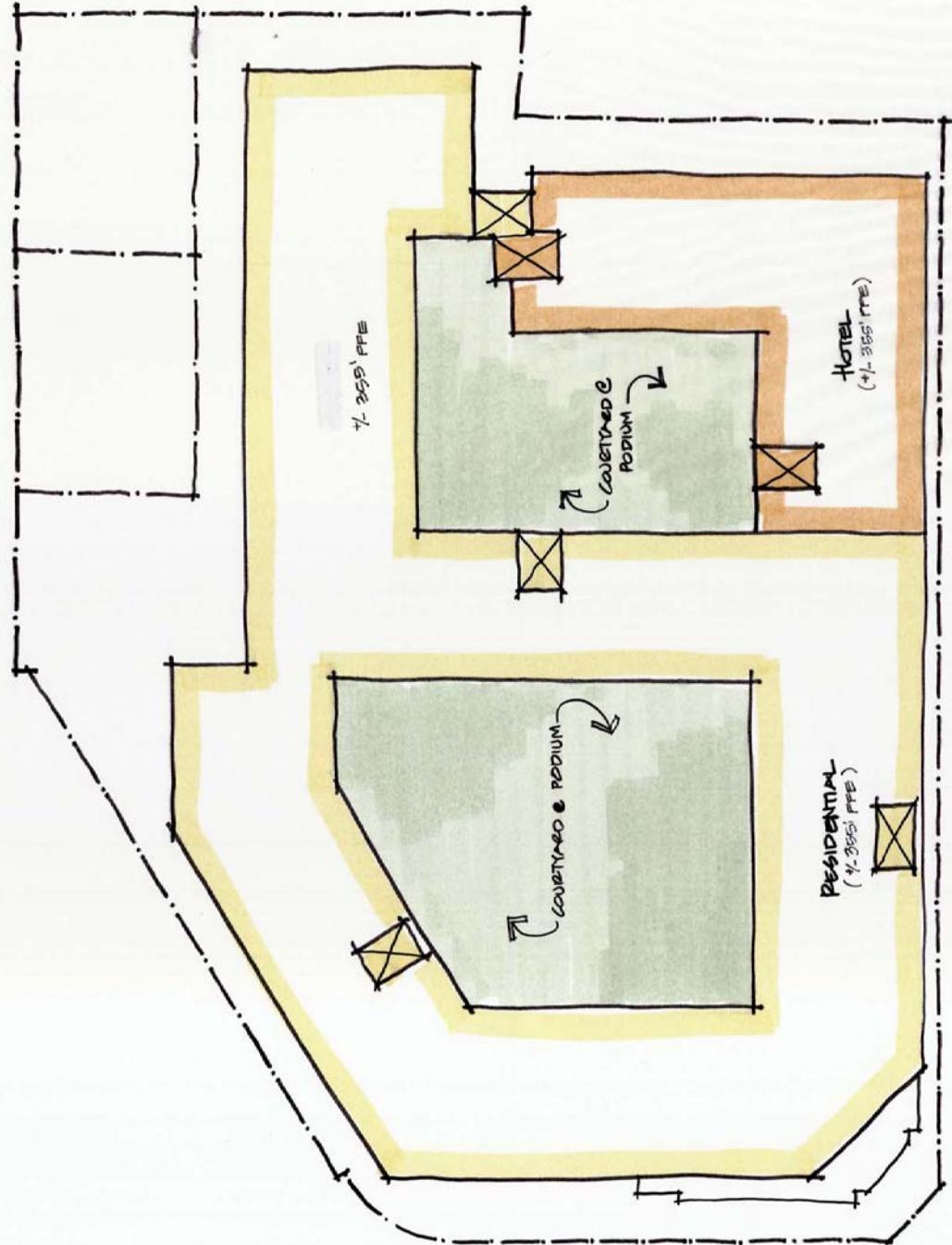
152 parking spaces
(excl. loading + stacking)

N West & W Broad Street

08/05/13



streetsense.
streetsense.com



N West & W Broad Street

08/05/13

Sketch of Upper Floors
Upper Floors Sketch - FFE
Spectrum | WEST & BROAD | Massing Study

ATTACHMENT II

Attachment III

North West and West Broad Street

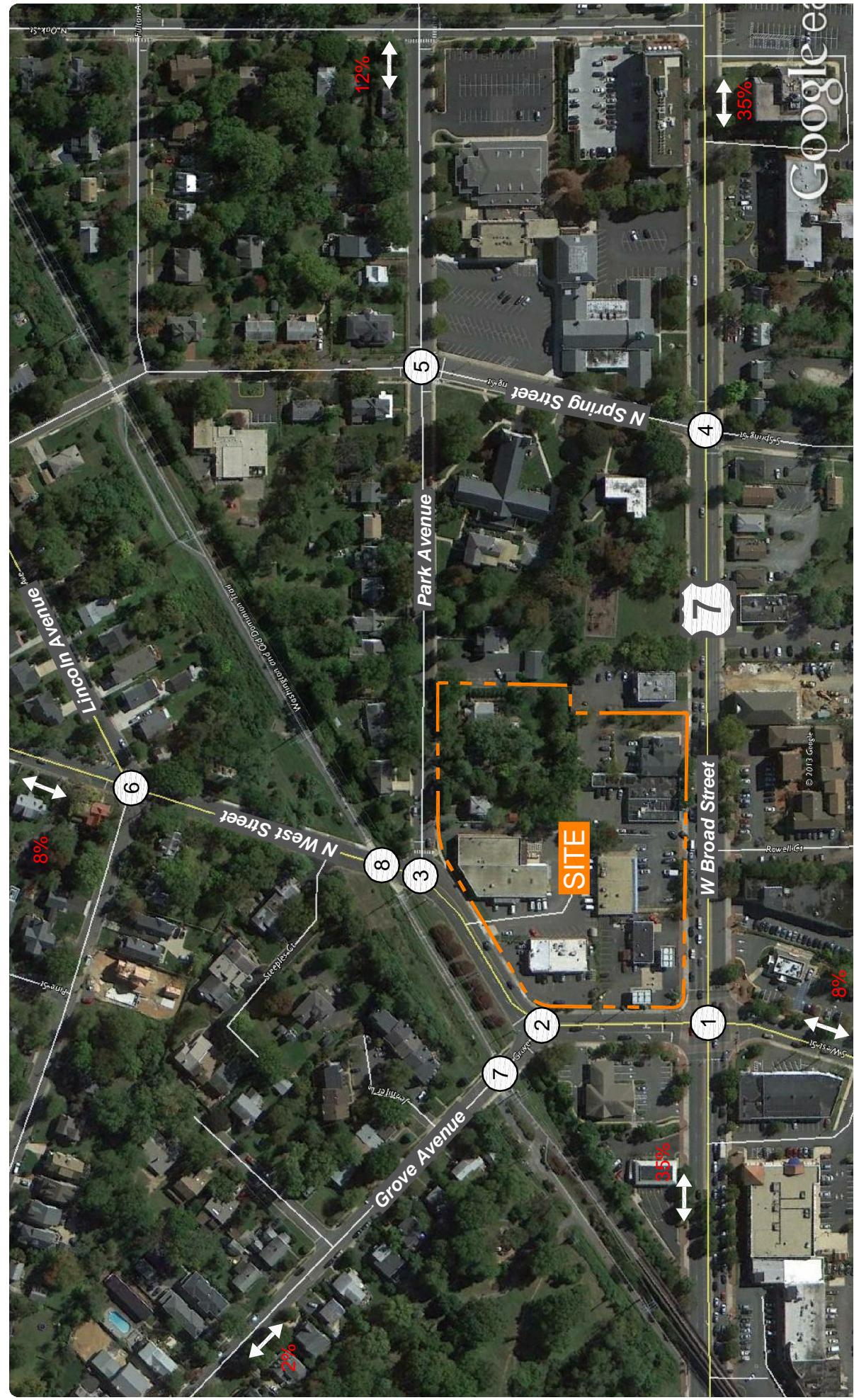
Trip Generation - Peak Hour of the Generator (I)(2)

Lot Number	Land Use Code	Amount	Unit	AM Peak Hour			PM Peak Hour			Average Daily Trips				
				In	Out	Total	In	Out	Total					
EXISTING USES														
51-202-009 Lot 1														
Gasoline/Service Station with Convenience Market	945	8	fueling positions	42	42	84	r	55	54	109	r			
51-202-010 Lot 2														
Convenience Market (Open 24 Hours)	851	3,928	GSF	141	146	287	r	109	101	210	r			
51-202-028 and 51-202-028 Outlot														
Specialty Retail Center	826	5,124	GSF	17	18	35	r	15	11	26	r			
51-202-011 Lot 3 and 51-202-012														
Warehousing	150	11,016	GSF	10	6	16	e	2	11	13	e			
51-202-005 Pt. Lot 1														
Specialty Retail Center	826	7,120	GSF	24	25	49	r	20	16	36	r			
51-202-004 Pt. Lot 2														
Specialty Retail Center	826	5,740	GSF	19	20	39	r	16	13	29	r			
51-202-013 Lot 2, 51-202-014 Lot 4 and 51-202-015 Lot 3														
Single-Family Detached Housing	210	3	dwelling units	4	10	14	e	3	2	5	e			
Total Existing Trips				257	267	524		220	208	428	5,079			
PROPOSED USES														
Scenario 2A														
Drive-in Bank	912	3,000	GSF	28	25	53	r	41	39	80	r			
Hotel	310	149	occupied rooms	53	43	96	e	61	46	107	e			
Pharmacy/Drugstore with Drive Through Window	881	14,800	GSF	62	62	124	r	72	72	144	r			
Apartment	220	274	dwelling units	44	106	150	e	109	70	179	e			
Specialty Retail Center	826	11,516	GSF	38	41	79	r	32	26	58	r			
Specialty Retail Center	826	12,468	GSF	41	44	85	r	35	28	63	r			
Single-Family Detached Housing	210	2	dwelling units	4	10	14	e	2	1	3	e			
Total Proposed Trips - Scenario 2A				270	331	601		352	282	634	6,083			
Total Net New Trips - Scenario 2A				13	64	77		132	74	206	1,004			
Scenario 2B														
Drive-in Bank	912	3,000	GSF	28	25	53	r	41	39	80	r			
Pharmacy/Drugstore with Drive Through Window	881	14,800	GSF	62	62	124	r	72	72	144	r			
General Office	710	40,044	GSF	81	11	92	e	21	102	123	e			
Apartment	220	274	dwelling units	44	106	150	e	109	70	179	e			
Specialty Retail Center	826	11,516	GSF	38	41	79	r	32	26	58	r			
Specialty Retail Center	826	14,904	GSF	49	53	102	r	42	33	75	r			
Single-Family Detached Housing	210	2	dwelling units	4	10	14	e	2	1	3	e			
Total Proposed Trips - Scenario 2B				306	308	614		319	343	662	5,517			
Total Net New Trips - Scenario 2B				49	41	90		99	135	234	438			

Note(s):

(1) Trip generation based on the Institute of Transportation Engineers' [Trip Generation Manual](#), 9th Edition.

(2) e = equations were used to calculate trip generation. r = rates were used to calculate trip generation.



Attachment IV
Trip Distribution and Study Intersections

(X) Study Intersection
XX% Site Trip Distribution

← North

ATTACHMENT V

ITEM DESCRIPTION	STANDARD
SOFTWARE	
Software Version	Synchro 7.
Build	Build 773, Rev 8 (or most current build).
Source of Synchro Base	VDOT Synchro files.
Analysis Performed	Signalized and STOP-controlled intersection capacity analysis.
Reports Generated	"HCM Signals", "HCM Unsignalized", and the "INT: Queues" reports should be used.
Analysis Period	15 minutes.
LAYOUT	
Street Names/Route Numbers	Verify all links have street names and/or Route numbers.
Number of Lanes/Lane Markings	Field verify.
Layout of Lanes	Use cardinal directions for approaches (N, S, E & W): Leesburg Pike (Route 7) – East-West Chain Bridge Road (Route 123) – East-West Refer to area studies for orientation of specific intersections.
Distance between Intersections (centerline to centerline)	Import and scale aerial for all Synchro bases. Adjust base as required.
Speed Limits	Field verify.
Lane Widths	Set as default of 12'.
Grades (if available)	Leave values from VDOT Synchro files.
Central Business District (CBD)	Leave unchecked.
Storage Lane Lengths	Storage Length = Full width + portion of taper to a width of 8' (approximately 1/3 of taper)
Number of Storage Lanes	Field verify.
Channelization (yield, stop, signal, free flow)	Field verify.
Curb Radius	Field verify.
Add/Drop Lanes	Field verify.
Right Turns on Red	Field verify.
Left Turn Lanes	Field verify protected or protected/permitted phasing.
Bus Stops/Shelters	Field verify.
Terrain	All terrain in Northern Virginia is "level".
VOLUMES	
Vehicle Volumes	Based on master list of Tysons Corner area baseline volumes.
Pedestrian Volumes	Code in conflicting peds from count sheets if available.
Bicycle Volumes	Code in conflicting bikes from count sheets if available.
Peak Hour Factors	Use existing PHF's by approach adjusted to $0.85 \leq \text{PHF} \leq 0.92$. Carry existing PHF's to future scenarios for existing

ATTACHMENT V

ITEM DESCRIPTION	STANDARD
	intersections/approaches. New/modified intersections should be coded with PHF's of 0.92.
Heavy Vehicle Percentages	Use count data by movement if data is available. If not, use 2008 VDOT ADT data by approach.
Bus Blockages per Hour	Code in for all affected lane groups if there is a bus stop at an intersection approach. Base on number on bus headway data (30 min = 2 stops per hour).
Adjacent Parking	Check for all affected lane groups if there is on-street parking at the intersection.
Parking Maneuvers per Hour	Use engineering judgment. (e.g. 5 parked cars * 1 maneuver/hr = 5 per hour)
TIMING/PHASING	
Current Signal Timing Plans	Obtain VDOT MIST timing sheets from VDOT or other area projects.
Turn Types (left and right turns)	<p>Field verify.</p> <p>For right turns that are coded as channelized yield control in the lane window, code them as permitted with the through movement on the same approach in the timing window, except in rare instances such as Route 123/Tysons Blvd.</p> <p>DO NOT code dual lefts as protected/permited EVER.</p>
Detector Phases Overrides	Leave consistent with VDOT Synchro files unless there is an obvious error. One error that seems to occur often is for right turn overlap phases; the detector phase should be coded with the mainline phase of the same approach, that is, not with the corresponding left turn movement.
Switch Phases Overrides	Leave consistent with VDOT Synchro files unless there is an obvious error.
Controller Type	Most likely either "Actd-Coord" or "Actd-Uncrd".
Cycle Length	Future signal timings should maintain corridor cycle lengths.
Minimum Green Time	New signals assume minimum G=7 seconds
Offset Time	Obtained from coordination sheet of MIST timing sheets.
Offset Referenced to (beginning of yellow, etc.)	Set for "Begin of Yellow".
Reference Phase	Almost always Phases 2 + 6. (Notable exception – Spring Hill Rd / International Dr / Jones Branch Dr. intersection)
Master Controller	Leave consistent with VDOT Synchro files.
Yield Point	Set as "Single".
Correct Phasing (split, lead, lag, etc.)	<p>Field verify.</p> <p>For new intersections/approaches, all lefts should be treated as protected on roadways with speeds 45mph (or higher) or</p>

ATTACHMENT V

ITEM DESCRIPTION	STANDARD
	with more than two opposing through lanes.
Minimum Initial	Based on "Phase Timing Bank" of MIST timing sheets. Usually 5-7s for lefts, 7-10s for side streets, and 10-20s for thrus.
Minimum Splits	Synchro can calculate as greater of min green + Y + AR or W + FDW + Y + AR.
Maximum Splits	<p>Based on "Coordination Sheet" or "Phase Timing Bank" of MIST timing sheets. Can be less than the min split if there is a pedestrian phase. (Ped call would override max split).</p> <p>For uncoordinated signals, field timings are recommended to verify how much time each phase actually is using.</p>
Yellow Time	<p>Based on "Phase Timing Bank" of MIST timing sheets. Usually 4 seconds.</p> <p>Minimum Y+All R=6 seconds per <i>Administrative Guidelines</i>.</p>
Red Time	<p>Based on "Phase Timing Bank" of MIST timing sheets. Usually 3 seconds.</p> <p>Minimum Y+All R=6 seconds per <i>Administrative Guidelines</i></p>
Lost Time Adjust	Set so that total lost time = 3 sec. (Y + R + Adj = 3)
Allow led/lag Optimization	Uncheck to prevent accidental "optimization".
Vehicle Extension	Based on "Phase Timing Bank" of MIST timing sheets. Usually 2-4 seconds.
Minimum Gap	Based on "Phase Timing Bank" of MIST timing sheets. Almost always same as vehicle extension. Usually 2-4 seconds.
Recall Modes	<p>For coordinated signals, the recall mode for the coordinated phases should be "C-Max". Other phases should be set to "No Recall".</p> <p>For uncoordinated phases, the mainline phases (2+6) should be set to "Min Recall". Other phases should be set to "No Recall".</p>
Pedestrian Phase	Based on "Phase Timing Bank" of MIST timing sheets.
Walk Time	Based on "Phase Timing Bank" of MIST timing sheets. Usually 7 seconds.
Flashing Don't Walk Time	Based on "Phase Timing Bank" of MIST timing sheets. For new signals FDW = distance (in feet) / 3.5 ft/sec.
Pedestrian Calls per Hour	Based on ped counts where available. Use nominal value (e.g. 5 calls) when no information available.
Dual Entry	Based on "Coordination Timing Parameters" of MIST sheets.
Inhibit Max	Check boxes for mainline/coordinated phases. Uncheck boxes for all other phases.
SIGNING (UNSIGNALIZED)	

ATTACHMENT V

ITEM DESCRIPTION	STANDARD
Controller Type	Set as “Unsig”.
Sign Control	Field verify.
Median Width	Equal to left turn lane width + additional median width.
TWLTL Median	Check if applicable. Use engineering judgment for storage length (e.g. distance to next driveway).
Right Turn Channelization	Should be same as in lane window.
SIMULATION SETTINGS	
Taper Lengths	Leave consistent with VDOT Synchro files unless there is an obvious error.
Lane alignment	Leave consistent with VDOT Synchro files unless there is an obvious error.
Enter Blocked Intersection	Leave consistent with VDOT Synchro files unless there is an obvious error.
Median widths	Equal to left turn lane width + additional median width.
Distance between offset legs of intersection	Leave consistent with VDOT Synchro files unless there is an obvious error.
Crosswalk widths	Leave consistent with VDOT Synchro files unless there is an obvious error.
Two-way Left Turn Lane	Check if applicable. Use engineering judgment for storage length (e.g. distance to next driveway).
Turning Speed	Leave consistent with VDOT Synchro files unless there is an obvious error.

Appendix C

Traffic and Pedestrian Count Data

Wells + Associates, Inc.

McLean, Virginia

Turning Movement Count - Total Vehicles

PROJECT: North West & West Broad					DATE: 9/12/2013					SOUTHBOUND ROAD: North West Street													
W+A JOB NO: 5897					DAY: Thursday					NORTHBOUND ROAD: South West Street													
INTERSECTION: W. Broad St. & N. West St.					WEATHER: clear					WESTBOUND ROAD: West Broad Street - 7													
LOCATION: Fairfax County, VA					COUNTED BY: Geraldin & Marlen					EASTBOUND ROAD: West Broad Street - 7													
INPUTED BY: agan																							
Time Period	Southbound North West Street				Westbound West Broad Street - 7				Northbound South West Street				Eastbound West Broad Street - 7				North & South	East & West	Total				
	Right	Thru	Left	Total	PHF	Right	Thru	Left	Total	PHF	Right	Thru	Left	Total	PHF								
15 Minute Volumes																							
6:00 AM - 6:15 AM	8	2	5	15		3	36	4	43		13	8	21		67	18	85		36	128	164		
6:15 AM - 6:30 AM	12	4	16			4	63	67			6	18	38		3	97	25	125		54	192	246	
6:30 AM - 6:45 AM	14	9	4	27		9	118		127		4	28	59		9	177	34	220		86	347	433	
6:45 AM - 7:00 AM	15	13	4	32		6	120	5	131		8	43	31	82		7	152	31	190		114	321	435
7:00 AM - 7:15 AM	24	8	5	37		3	151	4	158		5	62	62	129		7	154	48	209		166	367	533
7:15 AM - 7:30 AM	9	14	7	30		7	178	5	190		11	71	64	146		25	229	68	322		176	512	688
7:30 AM - 7:45 AM	29	18	7	54		19	210	7	236		6	74	55	135		21	231	64	316		189	552	741
7:45 AM - 8:00 AM	43	21	9	73		7	250	15	272		7	67	72	146		12	238	62	312		219	584	803
8:00 AM - 8:15 AM	32	22	12	66		11	221	2	234		14	51	46	111		12	212	44	268		177	502	679
8:15 AM - 8:30 AM	20	25	9	54		11	225	9	245		6	53	43	102		9	194	63	266		156	511	667
8:30 AM - 8:45 AM	31	13	5	49		3	192	4	199		15	59	59	133		9	178	48	235		182	434	616
8:45 AM - 9:00 AM	34	17	12	63		9	228	4	241		13	53	48	114		10	212	51	273		177	514	691
2:30 PM - 2:45 PM	39	31	20	90		11	191	14	216		11	28	42	81		30	165	40	235		171	451	622
2:45 PM - 3:00 PM	47	33	8	88		13	216	21	250		5	30	37	72		24	202	54	280		160	530	690
3:00 PM - 3:15 PM	61	33	14	108		7	201	20	228		8	33	27	68		29	193	39	261		176	489	665
3:15 PM - 3:30 PM	63	58	11	132		10	186	24	220		7	30	33	70		44	225	46	315		202	535	737
3:30 PM - 3:45 PM	43	37	9	89		14	221	28	263		4	13	31	48		25	215	40	280		137	543	680
3:45 PM - 4:00 PM	51	42	16	109		5	186	15	206		7	24	40	71		15	299	50	364		180	570	750
4:00 PM - 4:15 PM	66	67	9	142		5	220	26	251		7	28	30	65		25	297	52	374		207	625	832
4:15 PM - 4:30 PM	49	71	15	135		10	221	24	255		13	30	25	68		43	267	51	361		203	616	819
4:30 PM - 4:45 PM	65	93	21	179		2	196	30	228		18	43	29	90		24	229	46	299		269	527	796
4:45 PM - 5:00 PM	68	110	8	186		3	186	20	209		22	33	27	82		38	250	36	324		268	533	801
5:00 PM - 5:15 PM	58	91	8	157		3	196	19	218		10	38	36	84		25	270	56	351		241	569	810
5:15 PM - 5:30 PM	55	95	6	156		4	224	24	252		12	39	36	87		34	245	55	334		243	586	829
5:30 PM - 5:45 PM	66	81	12	159		1	180	17	198		12	47	38	97		17	255	77	349		256	547	803
5:45 PM - 6:00 PM	41	73	22	136		7	159	22	188		22	36	37	95		18	257	40	315		231	503	734
6:00 PM - 6:15 PM	66	82	9	157		14	221	27	262		9	33	36	78		27	279	63	369		235	631	866
6:15 PM - 6:30 PM	51	62	16	129		7	171	18	196		7	35	30	72		26	240	52	318		201	514	715
6:30 PM - 6:45 PM	43	51	14	108		8	138	14	160		16	36	29	81		26	289	41	356		189	516	705
6:45 PM - 7:00 PM	35	36	11	82		6	214	10	230		5	44	31	80		21	291	43	355		162	585	747
Total	1238	1312	308	2858		222	5519	432	6173		290	1192	1123	2605		615	6609	1437	8661		5463	14834	20297
One Hour Volumes																							
6:00 AM - 7:00 AM	49	28	13	90	0.7031	22	337	9	368	0.7023	18	102	80	200	0.6098	19	493	108	620	0.7045	290	988	1278
6:15 AM - 7:15 AM	65	34	13	112	0.7568	22	452	9	483	0.7642	23	151	134	308	0.5969	26	580	138	744	0.8455	420	1227	1647
6:30 AM - 7:30 AM	62	44	20	126	0.8514	25	567	14	606	0.7974	28	204	184	416	0.7123	48	712	181	941	0.7306	542	1547	2089
6:45 AM - 7:45 AM	77	53	23	153	0.7083	35	659	21	715	0.7574	30	250	212	492	0.8425	60	766	211	1037	0.8051	645	1752	2397
7:00 AM - 8:00 AM	105	61	28	194	0.6644	36	789	31	856	0.7868	29	274	253	556	0.9521	65	852	242	1159	0.8998	750	2015	2765
7:15 AM - 8:15 AM	113	75	35	223	0.7637	44	859	29	932	0.8566	38	263	237	538	0.9212	70	910	238	1218	0.9457	761	2150	2911
7:30 AM - 8:30 AM	124	86	37	247	0.8459	48	906	33	987	0.9072	33	245	216	494	0.8459	54	875	233	1162	0.9193	741	2149	2890
7:45 AM - 8:45 AM	126	81	35	242	0.8288	32	888	30	950	0.8732	42	230	220	492	0.8425	42	822	217	1081	0.8662	734	2031	2765
8:00 AM - 9:00 AM	117	77	38	232	0.8788	34	866	19	919	0.9378	48	216	196	460	0.8647	40	796	206	1042	0.9542	692	1961	2653
2:30 PM - 3:00 PM	210	155	53	418	0.7917	41	794	79	914	0.914	31	121	139	291	0.8981	127	785	179	1091	0.8659	709	2005	2714
2:45 PM - 3:45 PM	214	161	42	417	0.7898	44	824	93	961	0.9135	24	106	128	258	0.8958	122	835	179	1136	0.9016	675	2097	2772
3:00 PM - 4:00 PM	218	170	50	438	0.8295	36	794	87	917	0.8717	26	100	131	257	0.9049	113	932	175	1220	0.8379	695	2137	2832
3:15 PM - 4:15 PM	223	204	45	472	0.831	34	813	93	940	0.8935	25	95	134	254	0.8944	109	1036	188	1333	0.891	726	2273	2999
3:30 PM - 4:30 PM	209	217	49	475	0.8363	34	848	93	975	0.9268	31	95	126	252	0.8873	108	1078	193	1379	0.9218	727	2354	3081
3:45 PM - 4:45 PM	231	273	61	565	0.7891	22	823	95	940	0.9216	45	125	124	294	0.8167	107	1092	199	1398	0.9345	859	2338	3197
4:00 PM - 5:00 PM	248	341	53	642	0.8629	20	823	100	943	0.9245	60	134	111	305	0.8472	130	1043	185	1358	0.9078	947	2301	3248
4:15 PM - 5:15 PM	240	365	52	657	0.8831	18	799	93	910	0.8922	63	144	117	324	0.9	130	1016	189	1335	0.9245	981	2245	3226
4:30 PM - 5:30 PM	246	389	43	678	0.9113	12	802	93	907	0.8998	62	153	128	343	0.9528	121	994	193	1308	0.9316	1021	2215	3236
4:45 PM - 5:45 PM	247	377	34	658	0.8844	11	786	80	877	0.87	56	157	137	350	0.9021	114	1020	224	1358	0.9672	1008	2235	3243
5:00 PM - 6:00 PM	220	340	48	608	0.956	15	759	82	856	0.8942	56	160	147	363	0.9356	94	1027						

Wells + Associates, Inc.

McLean, Virginia

Pedestrian Volume Survey

Wells + Associates, Inc.

McLean, Virginia

Turning Movement Count - Total Vehicles

PROJECT: North West & West Broad	DATE: 9/12/2013	SOUTHBOUND ROAD: Grove Avenue																					
W+A JOB NO: 5897	DAY: Thursday	NORTHBOUND ROAD: North West Street																					
INTERSECTION: N. West St. & Grove Ave.	WEATHER: clear	WESTBOUND ROAD: North West Street																					
LOCATION: Fairfax County,VA	COUNTED BY: Farid	EASTBOUND ROAD: 0																					
	INPUTED BY: agan																						
Time Period	Southbound Grove Avenue				Westbound North West Street				Northbound North West Street				Eastbound 0				North & South	East & West	Total				
	Right	Thru	Left	Total	PHF	Right	Thru	Left	Total	PHF	Right	Thru	Left	Total	PHF								
15 Minute Volumes																							
6:00 AM - 6:15 AM	3	1	4			2	6	8			18	1	19					23	8	31			
6:15 AM - 6:30 AM	1	2	3			2	8	10			32	5	37					40	10	50			
6:30 AM - 6:45 AM	3	2	5			6	13	19			42	2	44					49	19	68			
6:45 AM - 7:00 AM	2	7	9			3	28	31			63	6	69					78	31	109			
7:00 AM - 7:15 AM	1	2	3			7	36	43			79	4	83					86	43	129			
7:15 AM - 7:30 AM	2	16	18			9	33	42			128	4	132					150	42	192			
7:30 AM - 7:45 AM	7	20	27			19	54	73			130	5	135					162	73	235			
7:45 AM - 8:00 AM	6	18	24			17	60	77			132	3	135					159	77	236			
8:00 AM - 8:15 AM	4	16	20			5	53	58			87		87					107	58	165			
8:15 AM - 8:30 AM	5	8	13			9	55	64			123	1	124					137	64	201			
8:30 AM - 8:45 AM	4	6	10			11	58	69			93	1	94					104	69	173			
8:45 AM - 9:00 AM	4	10	14			4	45	49			97	2	99					113	49	162			
2:30 PM - 2:45 PM	6	8	14			5	64	69			64	8	72					86	69	155			
2:45 PM - 3:00 PM	7	8	15			13	69	82			80	6	86					101	82	183			
3:00 PM - 3:15 PM	4	22	26			5	67	72			66	5	71					97	72	169			
3:15 PM - 3:30 PM	4	12	16			8	107	115			67	3	70					86	115	201			
3:30 PM - 3:45 PM	2	15	17			5	61	66			60	6	66					83	66	149			
3:45 PM - 4:00 PM	4	10	14			13	84	97			75	2	77					91	97	188			
4:00 PM - 4:15 PM	4	22	26			12	126	138			67	7	74					100	138	238			
4:15 PM - 4:30 PM	4	18	22			16	105	121			69	9	78					100	121	221			
4:30 PM - 4:45 PM	3	21	24			11	110	121			69	11	80					104	121	225			
4:45 PM - 5:00 PM	4	22	26			11	105	116			69	6	75					101	116	217			
5:00 PM - 5:15 PM	5	17	22			10	117	127			73	13	86					108	127	235			
5:15 PM - 5:30 PM	4	23	27			15	100	115			88	2	90					117	115	232			
5:30 PM - 5:45 PM	3	22	25			13	126	139			89	5	94					119	139	258			
5:45 PM - 6:00 PM	6	21	27			13	103	116			79	7	86					113	116	229			
6:00 PM - 6:15 PM	6	22	28			14	125	139			81	8	89					117	139	256			
6:15 PM - 6:30 PM	10	27	37			9	91	100			80	8	88					125	100	225			
6:30 PM - 6:45 PM	16	27	43			8	73	81			80	2	82					125	81	206			
6:45 PM - 7:00 PM	9	19	28			10	67	77			74	12	86					114	77	191			
Total	0	143	444	587		285	0	2149	2434		2354	154	0	2508			0	0	0	0	3095	2434	5529
One Hour Volumes																							
6:00 AM - 7:00 AM	9	12	21	0.5833	13	55	68	0.5484	155	14	169	0.6123									190	68	258
6:15 AM - 7:15 AM	7	13	20	0.5556	18	85	103	0.5988	216	17	233	0.7018									253	103	356
6:30 AM - 7:30 AM	8	27	35	0.4861	25	110	135	0.7849	312	16	328	0.6212									363	135	498
6:45 AM - 7:45 AM	12	45	57	0.5278	38	151	189	0.6473	400	19	419	0.7759									476	189	665
7:00 AM - 8:00 AM	16	56	72	0.6667	52	183	235	0.763	469	16	485	0.8981									557	235	792
7:15 AM - 8:15 AM	19	70	89	0.8241	50	200	250	0.8117	477	12	489	0.9056									578	250	828
7:30 AM - 8:30 AM	22	62	84	0.7778	50	222	272	0.8831	472	9	481	0.8907									565	272	837
7:45 AM - 8:45 AM	19	48	67	0.6979	42	226	268	0.8701	435	5	440	0.8148									507	268	775
8:00 AM - 9:00 AM	17	40	57	0.7125	29	211	240	0.8696	400	4	404	0.8145									461	240	701
2:30 PM - 3:30 PM	21	50	71	0.6827	31	307	338	0.7348	277	22	299	0.8692									370	338	708
2:45 PM - 3:45 PM	17	57	74	0.7115	31	304	335	0.7283	273	20	293	0.8517									367	335	702
3:00 PM - 4:00 PM	14	59	73	0.7019	31	319	350	0.7609	268	16	284	0.9221									357	350	707
3:15 PM - 4:15 PM	14	59	73	0.7019	38	378	416	0.7536	269	18	287	0.9318									360	416	776
3:30 PM - 4:30 PM	14	65	79	0.7596	46	376	422	0.7645	271	24	295	0.9455									374	422	796
3:45 PM - 4:45 PM	15	71	86	0.8269	52	425	477	0.8641	280	29	309	0.9656									395	477	872
4:00 PM - 5:00 PM	15	83	98	0.9423	50	446	496	0.8986	274	33	307	0.9594									405	496	901
4:15 PM - 5:15 PM	16	78	94	0.9038	48	437	485	0.9547	280	39	319	0.9273									413	485	898
4:30 PM - 5:30 PM	16	83	99	0.9167	47	432	479	0.9429	299	32	331	0.9194									430	479	909
4:45 PM - 5:45 PM	16	84	100	0.9259	49	448	497	0.8939	319	26	345	0.9176									445	497	942
5:00 PM - 6:00 PM	18	83	101	0.9352	51	446	497	0.8939	329	27	356	0.9468									457	497	954
5:15 PM - 6:15 PM	19	88	107	0.9554	55	454	509	0.9155	337	22	359	0.9548									466	509	975
5:30 PM - 6:30 PM	25	92	117	0.7905	49	445	494	0.8885	329	28	357	0.9495									474	494	968
5:45 PM - 6:45 PM	38	97	135	0.7849	44	392	436	0.7842	320	25	345	0.9691									480	436	916
6:00 PM - 7:00 PM	41	95	136	0.7907	41	356	397	0.714	315	30	345	0.9691									481	397	878

Wells + Associates, Inc.

McLean, Virginia

Pedestrian Volume Survey

Wells + Associates, Inc.

McLean, Virginia

Turning Movement Count - Total Vehicles

PROJECT: North West & West Broad	DATE: 9/12/2013	SOUTHBOUND ROAD: North West Street																			
W+A JOB NO: 5897	DAY: Thursday	NORTHBOUND ROAD: North West Street																			
INTERSECTION: N. West St. & Park Ave.	WEATHER: clear	WESTBOUND ROAD: Park Avenue																			
LOCATION: Fairfax County,VA	COUNTED BY: Muhamet & Mia	EASTBOUND ROAD: 0																			
	INPUTED BY: agan																				
Time Period	Southbound North West Street				Westbound Park Avenue				Northbound North West Street				Eastbound 0				North & South	East & West	Total		
	Right	Thru	Left	Total	PHF	Right	Thru	Left	Total	PHF	Right	Thru	Left	Total	PHF						
15 Minute Volumes																					
6:00 AM - 6:15 AM	4	1	5			1	2	3		8	13	21					26	3	29		
6:15 AM - 6:30 AM	7		7				5	5		15	28	43					50	5	55		
6:30 AM - 6:45 AM	16	2	18			1	7	8		14	41	55					73	8	81		
6:45 AM - 7:00 AM	21	1	22			2	5	7		13	64	77					99	7	106		
7:00 AM - 7:15 AM	17	2	19			1	18	19		14	90	104					123	19	142		
7:15 AM - 7:30 AM	22	1	23				21	21		22	135	157					180	21	201		
7:30 AM - 7:45 AM	37	12	49			4	28	32		41	119	160					209	32	241		
7:45 AM - 8:00 AM	35	7	42			8	51	59		36	124	160					202	59	261		
8:00 AM - 8:15 AM	32	2	34			5	17	22		17	91	108					142	22	164		
8:15 AM - 8:30 AM	46	6	52			3	19	22		32	116	148					200	22	222		
8:30 AM - 8:45 AM	38	6	44			9	25	34		26	97	123					167	34	201		
8:45 AM - 9:00 AM	46	8	54			3	19	22		25	101	126					180	22	202		
2:30 PM - 2:45 PM	48	5	53			5	24	29		27	47	74					127	29	156		
2:45 PM - 3:00 PM	51	6	57			1	33	34		43	60	103					160	34	194		
3:00 PM - 3:15 PM	52	10	62			3	24	27		54	39	93					155	27	182		
3:15 PM - 3:30 PM	65	5	70			8	52	60		44	49	93					163	60	223		
3:30 PM - 3:45 PM	61	2	63			5	17	22		33	49	82					145	22	167		
3:45 PM - 4:00 PM	81	2	83			10	23	33		23	69	92					175	33	208		
4:00 PM - 4:15 PM	88	8	96			5	34	39		34	56	90					186	39	225		
4:15 PM - 4:30 PM	92	10	102			11	31	42		32	71	103					205	42	247		
4:30 PM - 4:45 PM	96	3	99			4	36	40		32	58	90					189	40	229		
4:45 PM - 5:00 PM	109	6	115			5	15	20		32	61	93					208	20	228		
5:00 PM - 5:15 PM	111	12	123			6	26	32		36	65	101					224	32	256		
5:15 PM - 5:30 PM	98	12	110			7	45	52		28	89	117					227	52	279		
5:30 PM - 5:45 PM	104	9	113			7	29	36		32	86	118					231	36	267		
5:45 PM - 6:00 PM	99	8	107			9	27	36		25	83	108					215	36	251		
6:00 PM - 6:15 PM	102	8	110			4	35	39		32	81	113					223	39	262		
6:15 PM - 6:30 PM	88	5	93			3	30	33		36	90	126					219	33	252		
6:30 PM - 6:45 PM	66	3	69			4	23	27		32	81	113					182	27	209		
6:45 PM - 7:00 PM	62	3	65			5	19	24		31	73	104					169	24	193		
Total	0	1794	165	1959		139	0	740	879	869	2226	0	3095		0	0	0	0	5054	879	5933
One Hour Volumes																					
6:00 AM - 7:00 AM	48	4	52	0.5909		4	19	23	0.7188	50	146	196	0.6364					248	23	271	
6:15 AM - 7:15 AM	61	5	66	0.75		4	35	39	0.5132	56	223	279	0.6707					345	39	384	
6:30 AM - 7:30 AM	76	6	82	0.8913		4	51	55	0.6548	63	330	393	0.6258					475	55	530	
6:45 AM - 7:45 AM	97	16	113	0.5765		7	72	79	0.6172	90	408	498	0.7781					611	79	690	
7:00 AM - 8:00 AM	111	22	133	0.6786		13	118	131	0.5551	113	468	581	0.9078					714	131	845	
7:15 AM - 8:15 AM	126	22	148	0.7551		17	117	134	0.5678	116	469	585	0.9141					733	134	867	
7:30 AM - 8:30 AM	150	27	177	0.851		20	115	135	0.572	126	450	576	0.9					753	135	888	
7:45 AM - 8:45 AM	151	21	172	0.8269		25	112	137	0.5805	111	428	539	0.8422					711	137	848	
8:00 AM - 9:00 AM	162	22	184	0.8519		20	80	100	0.7353	100	405	505	0.853					689	100	789	
2:30 PM - 3:00 PM	216	26	242	0.8643		17	133	150	0.625	168	195	363	0.8811					605	150	755	
2:45 PM - 3:45 PM	229	23	252	0.9		17	126	143	0.5958	174	197	371	0.9005					623	143	766	
3:00 PM - 4:00 PM	259	19	278	0.8373		26	116	142	0.5917	154	206	360	0.9677					638	142	780	
3:15 PM - 4:15 PM	295	17	312	0.8125		28	126	154	0.6417	134	223	357	0.9597					669	154	823	
3:30 PM - 4:30 PM	322	22	344	0.8431		31	105	136	0.8095	122	245	367	0.8908					711	136	847	
3:45 PM - 4:45 PM	357	23	380	0.9314		30	124	154	0.9167	121	254	375	0.9102					755	154	909	
4:00 PM - 5:00 PM	385	27	412	0.8957		25	116	141	0.8393	130	246	376	0.9126					788	141	929	
4:15 PM - 5:15 PM	408	31	439	0.8923		26	108	134	0.7976	132	255	387	0.9393					826	134	960	
4:30 PM - 5:30 PM	414	33	447	0.9085		22	122	144	0.6923	128	273	401	0.8568					848	144	992	
4:45 PM - 5:45 PM	422	39	461	0.937		25	115	140	0.6731	128	301	429	0.9089					890	140	1030	
5:00 PM - 6:00 PM	412	41	453	0.9207		29	127	156	0.75	121	323	444	0.9407					897	156	1053	
5:15 PM - 6:15 PM	403	37	440	0.9735		27	136	163	0.7837	117	339	456	0.9661					896	163	1059	
5:30 PM - 6:30 PM	393	30	423	0.9358		23	121	144	0.9231	125	340	465	0.9226					888	144	1032	
5:45 PM - 6:45 PM	355	24	379	0.8614		20	115	135	0.8654	125	335	460	0.9127					839	135	974	
6:00 PM - 7:00 PM	318	19	337	0.7659		16	107	123	0.7885	131	325	456	0.9048					793	123	916	

Wells + Associates, Inc.

McLean, Virginia

Pedestrian Volume Survey

PROJECT: North West & West Broad
W + A JOB NO: 5897
INTERSECTION: N. West St. & Park Ave.
LOCATION: Fairfax County, VA
DATE: 9/12/2013
DAY: Thursday
WEATHER: clear
COUNTED BY: Muhamed
INPUTED BY: agan

Time Period	Movement												
	1	2	3	4	5	6	7	8	I + 2	3 + 4	5 + 6	7 + 8	Total
15 Minute Volumes													
6:00 AM - 6:15 AM			1										
6:15 AM - 6:30 AM				2									
6:30 AM - 6:45 AM		2	1										
6:45 AM - 7:00 AM			1										
7:00 AM - 7:15 AM	6	5											
7:15 AM - 7:30 AM													
7:30 AM - 7:45 AM													
7:45 AM - 8:00 AM													
8:00 AM - 8:15 AM		2											
8:15 AM - 8:30 AM													
8:30 AM - 8:45 AM													
8:45 AM - 9:00 AM		2											
2:30 PM - 2:45 PM													
2:45 PM - 3:00 PM	1	2											
3:00 PM - 3:15 PM	1												
3:15 PM - 3:30 PM													
3:30 PM - 3:45 PM	3												
3:45 PM - 4:00 PM													
4:00 PM - 4:15 PM													
4:15 PM - 4:30 PM													
4:30 PM - 4:45 PM													
4:45 PM - 5:00 PM													
5:00 PM - 5:15 PM													
5:15 PM - 5:30 PM													
5:30 PM - 5:45 PM													
5:45 PM - 6:00 PM	3												
6:00 PM - 6:15 PM													
6:15 PM - 6:30 PM													
6:30 PM - 6:45 PM													
6:45 PM - 7:00 PM													
Total	0	0	21	11	0	0	0	0					

One Hour Volumes

6:00 AM - 7:00 AM	3	4		7		7
6:15 AM - 7:15 AM	8	9		17		17
6:30 AM - 7:30 AM	8	7		15		15
6:45 AM - 7:45 AM	6	6		12		12
7:00 AM - 8:00 AM	6	5		11		11
7:15 AM - 8:15 AM	2			2		2
7:30 AM - 8:30 AM	2			2		2
7:45 AM - 8:45 AM	2			2		2
8:00 AM - 9:00 AM	4			4		4
2:30 PM - 3:30 PM	2	2		4		4
2:45 PM - 3:45 PM	5	2		7		7
3:00 PM - 4:00 PM	4			4		4
3:15 PM - 4:15 PM	3			3		3
3:30 PM - 4:30 PM	3			3		3
3:45 PM - 4:45 PM						
4:00 PM - 5:00 PM						
4:15 PM - 5:15 PM						
4:30 PM - 5:30 PM						
4:45 PM - 5:45 PM						
5:00 PM - 6:00 PM	3			3		3
5:15 PM - 6:15 PM	3			3		3
5:30 PM - 6:30 PM	3			3		3
5:45 PM - 6:45 PM	3			3		3
6:00 PM - 7:00 PM						
-						

Wells + Associates, Inc.

McLean, Virginia

Turning Movement Count - Total Vehicles

PROJECT: North West & West Broad										DATE: 9/12/2013										SOUTHBOUND ROAD: North Spring Street										
W+A JOB NO: 5897										DAY: Thursday										NORTHBOUND ROAD: North Spring Street										
INTERSECTION: W. Broad St. & N. Spring St.										WEATHER: clear										WESTBOUND ROAD: West Broad Street - 7										
LOCATION: Fairfax County,VA										COUNTED BY: Alba & Jacelin										EASTBOUND ROAD: West Broad Street - 7										
INPUTED BY: agan																														
Time Period	Southbound North Spring Street					Westbound West Broad Street - 7					Northbound North Spring Street					Eastbound West Broad Street - 7					North & South			East & West			Total			
	Right	Thru	Left	Total	PHF	Right	Thru	Left	Total	PHF	Right	Thru	Left	Total	PHF	Right	Thru	Left	Total	PHF	Right	Thru	Left	Total	PHF					
15 Minute Volumes																														
6:00 AM - 6:15 AM						1	39	40			1		1			1	64	65			1	105		106						
6:15 AM - 6:30 AM						6	68	74			4	4	8			2	96	4	102		8	176		184						
6:30 AM - 6:45 AM						5	121	1	127		2	3	1	6			187	3	190		6	317		323						
6:45 AM - 7:00 AM						1	113	114			1	1	1	3			133		133		3	247		250						
7:00 AM - 7:15 AM						2	138	2	142		3	4	6	13			1	164	165		13	307		320						
7:15 AM - 7:30 AM						1	159	2	162		7	8	1	16			6	224	5	235		16	397		413					
7:30 AM - 7:45 AM						9	193	3	205		7	33	7	47			2	207	9	218		47	423		470					
7:45 AM - 8:00 AM						16	250	9	275		5	17	4	26			1	227	12	240		26	515		541					
8:00 AM - 8:15 AM						7	217	1	225		3	5	8			4	212	8	224		8	449		457						
8:15 AM - 8:30 AM						7	185	1	193		4	13	4	21			4	247	6	257		21	450		471					
8:30 AM - 8:45 AM						4	205	4	213		5	15	4	24			1	212	4	217		24	430		454					
8:45 AM - 9:00 AM						6	196	4	206		8	3	7	18			1	220	4	225		18	431		449					
2:30 PM - 2:45 PM						13	237	7	257		2	2	3	7			4	156	30	190		7	447		454					
2:45 PM - 3:00 PM						9	235	4	248		2	2	3	7			2	221	6	229		7	477		484					
3:00 PM - 3:15 PM						9	178	2	189		3	5	1	9			1	184	6	191		9	380		389					
3:15 PM - 3:30 PM						8	215	11	234		5	3	5	13				230	4	234		13	468		481					
3:30 PM - 3:45 PM						8	248	5	261		11	1	2	14			4	218	5	227		14	488		502					
3:45 PM - 4:00 PM						8	193	6	207		8	2		10			4	270	7	281		10	488		498					
4:00 PM - 4:15 PM						9	248	10	267		5	2	1	8			6	275	6	287		8	554		562					
4:15 PM - 4:30 PM						5	210	4	219		5	5	3	13			1	257	4	262		13	481		494					
4:30 PM - 4:45 PM						14	256	10	280		7			7			5	259	7	271		7	551		558					
4:45 PM - 5:00 PM						6	196	13	215		4	1	3	8			2	265	2	269		8	484		492					
5:00 PM - 5:15 PM						9	202	5	216		9	3	3	15			8	273	8	289		15	505		520					
5:15 PM - 5:30 PM						7	230	8	245		3	4	1	8			5	249	6	260		8	505		513					
5:30 PM - 5:45 PM						5	262	8	275		3		1	4			4	294	5	303		4	578		582					
5:45 PM - 6:00 PM						9	217	12	238		6	2	5	13			5	299	7	311		13	549		562					
6:00 PM - 6:15 PM						6	250	9	265		7	2	4	13			4	275	5	284		13	549		562					
6:15 PM - 6:30 PM						4	208	10	222		4	1	2	7			6	262	2	270		7	492		499					
6:30 PM - 6:45 PM						5	190	6	201		9	2	1	12			6	285	7	298		12	499		511					
6:45 PM - 7:00 PM						13	228	8	249		5	5	1	11			4	304	6	314		11	563		574					
Total	0	0	0	0	0	212	5887	165	6264		148	148	74	370			94	6769	178	7041		370	13305		13675					
One Hour Volumes																														
6:00 AM - 7:00 AM						13	341	1	355	0.6988	8	8	2	18	0.5625	3	480	7	490	0.6447	18	845		863						
6:15 AM - 7:15 AM						14	440	3	457	0.8046	10	12	8	30	0.5769	3	580	7	590	0.7763	30	1047		1077						
6:30 AM - 7:30 AM						9	531	5	545	0.841	13	16	9	38	0.5938	7	708	8	723	0.7691	38	1268		1306						
6:45 AM - 7:45 AM						13	603	7	623	0.7598	18	46	15	79	0.4202	9	728	14	751	0.7989	79	1374		1453						
7:00 AM - 8:00 AM						28	740	16	784	0.7127	22	62	18	102	0.5426	10	822	26	858	0.8938	102	1642		1744						
7:15 AM - 8:15 AM						33	819	15	867	0.7882	22	63	12	97	0.516	13	870	34	917	0.9552	97	1784		1881						
7:30 AM - 8:30 AM						39	845	14	898	0.8164	19	68	15	102	0.5426	11	893	35	939	0.9134	102	1837		1939						
7:45 AM - 8:45 AM						34	857	15	906	0.8236	17	50	12	79	0.7596	10	898	30	938	0.9125	79	1844		1923						
8:00 AM - 9:00 AM						24	803	10	837	0.93	20	36	15	71	0.7396	10	891	22	923	0.8979	71	1760		1831						
2:30 PM - 2:45 PM						39	865	24	928	0.9027	12	12	12	36	0.6923	7	791	46	844	0.9017	36	1772		1808						
2:45 PM - 3:45 PM						34	876	22	932	0.8927	21	11	11	43	0.7679	7	853	21	881	0.9412	43	1813		1856						
3:00 PM - 4:00 PM						33	834	24	891	0.8534	27	11	8	46	0.8214	9	902	22	933	0.8301	46	1824		1870						
3:15 PM - 4:15 PM						33	904	32	969	0.9073	29	8	8	45	0.8036	14	993	22	1029	0.8963	45	1998		2043						
3:30 PM - 4:30 PM						30	899	25	954	0.8933	29	10	6	45	0.8036	15	1020	22	1057	0.9207	45	2011		2056						
3:45 PM -																														

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McLean, Virginia

Pedestrian Volume Survey

Wells + Associates, Inc.

McLean, Virginia

Turning Movement Count - Total Vehicles

PROJECT: North West & West Broad	DATE: 9/12/2013	SOUTHBOUND ROAD: North Spring Street																					
W+A JOB NO: 5897	DAY: Thursday	NORTHBOUND ROAD: North Spring Street																					
INTERSECTION: N. Spring St. & Park Ave.	WEATHER: clear	WESTBOUND ROAD: Park Avenue																					
LOCATION: Fairfax County,VA	COUNTED BY: Edvin	EASTBOUND ROAD: Park Avenue																					
	INPUTED BY: agan																						
Time Period	Southbound North Spring Street				Westbound Park Avenue				Northbound North Spring Street				Eastbound Park Avenue				North & South	East & West	Total				
	Right	Thru	Left	Total	PHF	Right	Thru	Left	Total	PHF	Right	Thru	Left	Total	PHF	Right				Thru	Left	Total	PHF
15 Minute Volumes																							
6:00 AM - 6:15 AM						5		5			2		2				5		5				
6:15 AM - 6:30 AM	I		I			2		2			4	I	I	6			8	3	11				
6:30 AM - 6:45 AM						3		3			1	3	3	7			16		16				
6:45 AM - 7:00 AM	2	I	3			1	4	5			2	I	I	3			11	3	14				
7:00 AM - 7:15 AM		I	I			15		15			4	5	2	11			17	2	19				
7:15 AM - 7:30 AM	I	I	2			1	13	14			5	12	3	20			21	3	24				
7:30 AM - 7:45 AM	2		13	15		6	33	39			44	6	3	53			50	I	51				
7:45 AM - 8:00 AM	4	5	9			5	40	45			41	15	9	65			34	3	37				
8:00 AM - 8:15 AM	6		6			2	14	16			4	10	4	18			13	6	19				
8:15 AM - 8:30 AM	6		2	8		3	15	18			7	12	3	22			31	4	35				
8:30 AM - 8:45 AM	8	I	9			2	21	23			6	7	5	18			28	2	30				
8:45 AM - 9:00 AM	3		5	8		4	14	18			2	7	4	13			30	4	34				
2:30 PM - 2:45 PM	2	I	3			26		26			11	4	3	18			31	I	32				
2:45 PM - 3:00 PM	I		I			1	33	34			10	3	2	15			54	2	56				
3:00 PM - 3:15 PM		I	I			2	22	24			18	5	I	24			53	I	54				
3:15 PM - 3:30 PM	5	2	7			15	56	71			11	3	I	14			38	7	45				
3:30 PM - 3:45 PM	3	I	4			23		23			9	2	I	11			33	I	34				
3:45 PM - 4:00 PM						33		33			12	3	2	17			25	2	27				
4:00 PM - 4:15 PM	2	3	5			3	30	33			9	2	I	12			38	I	39				
4:15 PM - 4:30 PM	5	3	8			I	37	38			7	3	I	10			41	I	42				
4:30 PM - 4:45 PM	I	5	6			8	16	24			6	21	3	30			15	3	18				
4:45 PM - 5:00 PM	3	2	5			3	19	22			6	3	I	9			32	2	34				
5:00 PM - 5:15 PM	4	5	9			28		28			6	7	3	16			46	7	53				
5:15 PM - 5:30 PM	7	4	11			2	40	42			3	5	2	10			37	4	41				
5:30 PM - 5:45 PM	4	7	11			3	20	23			I	3	3	7			27	4	31				
5:45 PM - 6:00 PM	3	4	7			1	28	29			4	3	5	12			25	3	28				
6:00 PM - 6:15 PM	2	4	6			3	33	36			2	3	8	13			36	2	38				
6:15 PM - 6:30 PM	I		I			26		26			I	I	3	5			36	I	37				
6:30 PM - 6:45 PM	2	I	3			6	12	18			4	2	4	10			30		30				
6:45 PM - 7:00 PM	I	4	5			I	29	30			12	3	I	16			31	2	33				
Total	79	0	76	155		73	690	0	763		252	157	78	487			0	892	75	967			
One Hour Volumes																							
6:00 AM - 7:00 AM	3	I	4	0.3333		I	14	15	0.75	7	7	4	18	0.6429			40	6	46	0.7188	22	61	83
6:15 AM - 7:15 AM	3	2	5	0.4167		I	24	25	0.4167	11	10	6	27	0.6136			52	8	60	0.7895	32	85	117
6:30 AM - 7:30 AM	3	3	6	0.5		2	35	37	0.6167	12	21	8	41	0.5125			65	8	73	0.7604	47	110	157
6:45 AM - 7:45 AM	5	16	21	0.35		8	65	73	0.4679	55	24	8	87	0.4104			99	9	108	0.5294	108	181	289
7:00 AM - 8:00 AM	7	20	27	0.45		12	101	113	0.6278	94	38	17	149	0.5731			122	9	131	0.6422	176	244	420
7:15 AM - 8:15 AM	13	19	32	0.5333		14	100	114	0.6333	94	43	19	156	0.6			118	13	131	0.6422	188	245	433
7:30 AM - 8:30 AM	18	20	38	0.6333		16	102	118	0.6556	96	43	19	158	0.6077			128	14	142	0.6961	196	260	456
7:45 AM - 8:45 AM	24	8	32	0.8889		12	90	102	0.5667	58	44	21	123	0.4731			106	15	121	0.8176	155	223	378
8:00 AM - 9:00 AM	23	8	31	0.8611		11	64	75	0.8152	19	36	16	71	0.8068			102	16	118	0.8429	102	193	295
2:30 PM - 3:00 PM	8	4	12	0.4286		18	137	155	0.5458	50	15	6	71	0.7396			176	11	187	0.8348	83	342	425
2:45 PM - 3:45 PM	9	4	13	0.4643		18	134	152	0.5352	48	13	3	64	0.6667			178	11	189	0.8438	77	341	418
3:00 PM - 4:00 PM	8	4	12	0.4286		17	134	151	0.5317	50	13	3	66	0.6875			149	11	160	0.7407	78	311	389
3:15 PM - 4:15 PM	10	6	16	0.5714		18	142	160	0.5634	41	10	3	54	0.7941			134	11	145	0.8056	70	305	375
3:30 PM - 4:30 PM	10	7	17	0.5313		4	123	127	0.8355	37	10	3	50	0.7333			137	5	142	0.8452	67	269	336
3:45 PM - 4:45 PM	8	11	19	0.5938		12	116	128	0.8421	34	29	6	69	0.575			119	7	126	0.75	88	254	342
4:00 PM - 5:00 PM	11	13	24	0.75		15	102	117	0.7697	28	29	4	61	0.5083			126	7	133	0.7917	85	250	335
4:15 PM - 5:15 PM	13	15	28	0.7778		12	100	112	0.7368	25	34	6	65	0.5417			134	13	147	0.6934	93	259	352
4:30 PM - 5:30 PM	15	16	31	0.7045		13	103	116	0.6905	21	36	8	65	0.5417			130	16	146	0.6887	96	262	358
4:45 PM - 5:45 PM	18	18	36	0.8182		8	107	115	0.6845	16	18	8	42	0.6563			142	17	159	0.75	78	274	352
5:00 PM - 6:00 PM	18	20	38	0.8636		6	116	122	0.7262	14	18	13	45	0.7031			135	18	153	0.7217	83	275	358
5:15 PM - 6:15 PM	16	19	35	0.7955		9	121	130	0.7738	10	14	18	42	0.8077			125	13	138	0.8415	77	268	345
5:30 PM - 6:30 PM	10	15	25	0.5682		7	107	114	0.7917	8	10	19	37	0.7115			124	10	134	0.8816	62	248	310
5:45 PM - 6:45 PM	8	9	17	0.6071		10	99	109	0.7569	11	9	20	40	0.7692			127	6	133	0.875	57	242	299
6:00 PM - 7:00 PM	6	9	15	0.625		10	100	110	0.7639	19	9	16	44	0.6875			133	5	138	0.9079	59	248	307

Wells + Associates, Inc.

McLean, Virginia

Pedestrian Volume Survey

Wells + Associates, Inc.

McLean, Virginia

Turning Movement Count - Total Vehicles

PROJECT: North West & West Broad								DATE: 9/12/2013								SOUTHBOUND ROAD: North West Street													
W+A JOB NO: 5897								DAY: Thursday								NORTHBOUND ROAD: North West Street													
INTERSECTION: N. West St. & Lincoln Ave.								WEATHER: clear								WESTBOUND ROAD: Lincoln Avenue													
LOCATION: Fairfax County,VA								COUNTED BY: Camil & Dragan								EASTBOUND ROAD: Lincoln Avenue													
INPUTED BY: agan																													
Time Period	Southbound North West Street				Westbound Lincoln Avenue				Northbound North West Street				Eastbound Lincoln Avenue				North & South			East & West			Total						
	Right	Thru	Left	Total	PHF	Right	Thru	Left	Total	PHF	Right	Thru	Left	Total	PHF	Right	Thru	Left	Total	PHF									
15 Minute Volumes																													
6:00 AM - 6:15 AM	5	5				1	2	3		4	11	1	16									21	3	24					
6:15 AM - 6:30 AM	4	4				3	3			17	11		28									32	3	35					
6:30 AM - 6:45 AM	13	1	14			3	3			12	29	1	42									56	4	60					
6:45 AM - 7:00 AM	14	14				5	5			19	45		64									78	6	84					
7:00 AM - 7:15 AM	I	13	2	16		6	6			33	58	3	94					2	1	3		110	9	119					
7:15 AM - 7:30 AM	20	3	23			I	5	6		56	82	2	140					I	1	1		163	7	170					
7:30 AM - 7:45 AM	37	1	38			2	12	14		51	71		122					2		2		160	16	176					
7:45 AM - 8:00 AM	32	4	36			I	3	13	17	49	75		124					I	I	2		160	19	179					
8:00 AM - 8:15 AM	28	5	33			4	1	10	15	47	63		110					I	2	3		143	18	161					
8:15 AM - 8:30 AM	I	37	1	39		9	9			47	68	1	116					3	2	5		155	14	169					
8:30 AM - 8:45 AM	41	2	43			8	8			39	64	1	104					I	I	2		147	10	157					
8:45 AM - 9:00 AM	38	2	40			3	1	17	21	47	60	2	109					I	I	2		149	23	172					
2:30 PM - 2:45 PM	36	I	37			I	18	19		16	43	1	60									97	19	116					
2:45 PM - 3:00 PM	47	47				3	I	14	18	12	47	1	60									107	18	125					
3:00 PM - 3:15 PM	44	3	47			2	21	23		9	31	1	41					2	I	3		88	26	114					
3:15 PM - 3:30 PM	45	45				4	25	29		15	34	5	54									99	29	128					
3:30 PM - 3:45 PM	I	45	46			I	19	20		18	35	3	56					2	2	4		102	24	126					
3:45 PM - 4:00 PM	3	59	62			4	24	28		27	48	1	76					I	I	2		138	30	168					
4:00 PM - 4:15 PM	2	67	1	70		3	34	37		21	46		67									137	39	176					
4:15 PM - 4:30 PM	75	4	79			2	2	32	36	24	62		86					I	I	2		165	38	203					
4:30 PM - 4:45 PM	I	69	4	74		I	I	28	30	13	47	1	61					2		2		135	32	167					
4:45 PM - 5:00 PM	81	2	83			I	1	36	38	23	44	2	69					I	4	5		152	43	195					
5:00 PM - 5:15 PM	I	75	3	79		I	5	39	45	22	42	3	67					5	2	7		146	52	198					
5:15 PM - 5:30 PM	78	3	81			2	31	33		36	61	1	98					2	2	4		179	37	216					
5:30 PM - 5:45 PM	77	8	85			4	2	37	43	31	64	1	96					I	3	4		181	47	228					
5:45 PM - 6:00 PM	79	5	84			I	2	36	39	30	62	3	95					I	6	7		179	46	225					
6:00 PM - 6:15 PM	77	77				2	38	40		34	37	5	76					I	I	1		153	41	194					
6:15 PM - 6:30 PM	63	I	64			I	I	31	33	41	51	2	94					I	2	3		158	36	194					
6:30 PM - 6:45 PM	I	47	3	51		I	3	26	30	37	54	1	92					I	3	4		143	34	177					
6:45 PM - 7:00 PM	42	3	45			2	3	26	31	29	50	3	82					I	2	3		127	34	161					
Total	I	1388	62	1461		35	39	608	682	859	1495	45	2399					35	39	I	75	3860	757	4617					
One Hour Volumes																													
6:00 AM - 7:00 AM	36	I	37	0.6607		I	13	14	0.7	52	96	2	150	0.5859	I	I	2	0.5	187	16	203								
6:15 AM - 7:15 AM	I	44	3	48	0.75		17	17	0.7083	81	143	4	228	0.6064	3	2	5	0.4167	276	22	298								
6:30 AM - 7:30 AM	I	60	6	67	0.7283		I	19	20	0.8333	120	214	6	340	0.6071	3	3	6	0.5	407	26	433							
6:45 AM - 7:45 AM	I	84	6	91	0.5987		2	1	28	31	0.5536	159	256	5	420	0.75	4	3	7	0.5833	511	38	549						
7:00 AM - 8:00 AM	I	102	10	113	0.7434		3	4	36	43	0.6324	189	286	5	480	0.8571	5	3	8	0.6667	593	51	644						
7:15 AM - 8:15 AM	117	13	130	0.8553		7	5	40	52	0.7647	203	291	2	496	0.8857	4	4	8	0.6667	626	60	686							
7:30 AM - 8:30 AM	I	134	11	146	0.9359		7	4	44	55	0.8088	194	277	1	472	0.9516	7	5	12	0.6	618	67	685						
7:45 AM - 8:45 AM	I	138	12	151	0.8779		5	4	40	49	0.7206	182	270	2	454	0.9153	6	6	12	0.6	605	61	666						
8:00 AM - 9:00 AM	I	144	10	155	0.9012		7	2	44	53	0.631	180	255	4	439	0.9461	6	6	12	0.6	594	65	659						
2:30 PM - 3:30 PM	172	4	176	0.9362		7	4	78	89	0.7672	52	155	8	215	0.8958	2	I	3	0.25	391	92	483							
2:45 PM - 3:45 PM	I	181	3	185	0.984		8	3	79	90	0.7759	54	147	10	211	0.8792	4	3	7	0.4375	396	97	493						
3:00 PM - 4:00 PM	4	193	3	200	0.8065		5	6	89	100	0.8621	69	148	10	227	0.7467	5	3	1	9	0.5625	427	109	536					
3:15 PM - 4:15 PM	6	216	I	223	0.7964		5	7	102	114	0.7703	81	163	9	253	0.8322	5	2	1	8	0.5	476	122	598					
3:30 PM - 4:30 PM	6	246	5	257	0.8133		3	9	109	121	0.8176	90	191	4	285	0.8285	6	3	1	10	0.625	542	131	673					
3:45 PM - 4:45 PM	6	270	9	285	0.9019		3	10	118	131	0.8851	85	203	2	290	0.843	6	1	1	8	1	575	139	714					
4:00 PM - 5:00 PM	3	292	11	306	0.9217		4	7	130	141	0.9276	81	199	3	283	0.8227	6	5	11	0.55	589	152	741						
4:15 PM - 5:15 PM	2	300	13	315	0.9488		5	9	135	149	0.8278	82	195	6	283	0.8227	9	7	16	0.5714	598	165	763						
4:30 PM - 5:30 PM	2	303	12	317	0.9548		3	9	134	146	0.8111	94	194	7	295	0.7526	10	8	18	0.6429	612	164	776						
4:45 PM - 5:45 PM	I	311	16	328	0.9647		6	10	143	159	0.8833	112	211	7	330	0.8418	9	11	20	0.7143	658	179	837						
5:00 PM - 6:00 PM	I	309	19	329	0.9676		6	11	143	160	0.8889																		

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Pedestrian Volume Survey

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Turning Movement Count - Bicycles

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Turning Movement Count - Bicycles

PROJECT: North West & West Broad	DATE: 9/14/2013	SOUTHBOUND ROAD: Grove Avenue															
W+A JOB NO: 5897	DAY: Saturday	NORTHBOUND ROAD: Grove Avenue															
INTERSECTION: Grove Ave. & W & OD Trail	WEATHER: clear	WESTBOUND ROAD: W & OD Trail															
LOCATION: Fairfax County, VA	COUNTED BY: Tyler	EASTBOUND ROAD: W & OD Trail															
	INPUTTED BY: agan																
Time Period	Southbound Grove Avenue			Westbound W & OD Trail			Northbound Grove Avenue			Eastbound W & OD Trail			North & South	East & West	Total		
	Right	Thru	Left	Total	Right	Thru	Left	Total	Right	Thru	Left	Total					
15 Minute Volumes																	
10:00 AM - 10:15 AM					17		17			16		16	33	33			
10:15 AM - 10:30 AM					40		40			18		18	58	58			
10:30 AM - 10:45 AM					28		28			22		22	50	50			
10:45 AM - 11:00 AM					20		20			19		19	39	39			
11:00 AM - 11:15 AM					32		32			17		17	49	49			
11:15 AM - 11:30 AM					20		20			16		16	36	36			
11:30 AM - 11:45 AM					21		21			26		26	47	47			
11:45 AM - 12:00 PM					25		25			27		27	52	52			
12:00 PM - 12:15 PM					15		15			33		33	48	48			
12:15 PM - 12:30 PM					26		26			25		25	51	51			
12:30 PM - 12:45 PM					14		14			25		25	39	39			
12:45 PM - 1:00 PM					28		28			19		19	47	47			
1:00 PM - 1:15 PM					17		17			25		25	42	42			
1:15 PM - 1:30 PM					18		18			26		26	44	44			
1:30 PM - 1:45 PM					34		34			31		31	65	65			
1:45 PM - 2:00 PM					16		16			27		27	43	43			
2:00 PM - 2:15 PM					39		39			26		26	65	65			
2:15 PM - 2:30 PM					27		27			41		41	68	68			
2:30 PM - 2:45 PM					19		19			23		23	42	42			
2:45 PM - 3:00 PM					25		25			33		33	58	58			
Total	0	0	0	0	481	0	481	0	0	0	0	495	0	495	0	976	976
One Hour Volumes																	
10:00 AM - 11:00 AM					105		105			75		75	180	180			
10:15 AM - 11:15 AM					120		120			76		76	196	196			
10:30 AM - 11:30 AM					100		100			74		74	174	174			
10:45 AM - 11:45 AM					93		93			78		78	171	171			
11:00 AM - 12:00 PM					98		98			86		86	184	184			
11:15 AM - 12:15 PM					81		81			102		102	183	183			
11:30 AM - 12:30 PM					87		87			111		111	198	198			
11:45 AM - 12:45 PM					80		80			110		110	190	190			
12:00 PM - 1:00 PM					83		83			102		102	185	185			
12:15 PM - 1:15 PM					85		85			94		94	179	179			
12:30 PM - 1:30 PM					77		77			95		95	172	172			
12:45 PM - 1:45 PM					97		97			101		101	198	198			
1:00 PM - 2:00 PM					85		85			109		109	194	194			
1:15 PM - 2:15 PM					107		107			110		110	217	217			
1:30 PM - 2:30 PM					116		116			125		125	241	241			
1:45 PM - 2:45 PM					101		101			117		117	218	218			
2:00 PM - 3:00 PM					110		110			123		123	233	233			

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McLean, Virginia

Pedestrian Volume Survey

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Turning Movement Count - Bicycles

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Turning Movement Count - Bicycles

PROJECT: North West & West Broad				DATE: 9/14/2013				SOUTHBOUND ROAD: North West Street							
W+A JOB NO: 5897				DAY: Saturday				NORTHBOUND ROAD: North West Street							
INTERSECTION: N. West St. & W & OD Trail				WEATHER: clear				WESTBOUND ROAD: W & OD Trail							
LOCATION: Fairfax County, VA				COUNTED BY: Farid				EASTBOUND ROAD: W & OD Trail							
INPUTTED BY: agan															
Time Period	Southbound North West Street			Westbound W & OD Trail			Northbound North West Street			Eastbound W & OD Trail			North & South	East & West	Total
	Right	Thru	Left	Total	Right	Thru	Left	Total	Right	Thru	Left	Total			
15 Minute Volumes															
10:00 AM - 10:15 AM					17		17			11		11	28	28	
10:15 AM - 10:30 AM					37		37			15		15	52	52	
10:30 AM - 10:45 AM					25		25			23		23	48	48	
10:45 AM - 11:00 AM					16		16			20		20	36	36	
11:00 AM - 11:15 AM					25		25			14		14	39	39	
11:15 AM - 11:30 AM					10		10			13		13	23	23	
11:30 AM - 11:45 AM					17		17			25		25	42	42	
11:45 AM - 12:00 PM					17		17			23		23	40	40	
12:00 PM - 12:15 PM					13		13			26		26	39	39	
12:15 PM - 12:30 PM					31		31			25		25	56	56	
12:30 PM - 12:45 PM					13		13			17		17	30	30	
12:45 PM - 1:00 PM					21		21			17		17	38	38	
1:00 PM - 1:15 PM					16		16			18		18	34	34	
1:15 PM - 1:30 PM					17		17			20		20	37	37	
1:30 PM - 1:45 PM					17		17			24		24	41	41	
1:45 PM - 2:00 PM					5		5			18		18	23	23	
2:00 PM - 2:15 PM					33		33			16		16	49	49	
2:15 PM - 2:30 PM					18		18			29		29	47	47	
2:30 PM - 2:45 PM					20		20			15		15	35	35	
2:45 PM - 3:00 PM					17		17			21		21	38	38	
Total	0	0	0	0	385	0	385	0	0	390	0	390	775	775	
One Hour Volumes															
10:00 AM - 11:00 AM					95		95			69		69	164	164	
10:15 AM - 11:15 AM					103		103			72		72	175	175	
10:30 AM - 11:30 AM					76		76			70		70	146	146	
10:45 AM - 11:45 AM					68		68			72		72	140	140	
11:00 AM - 12:00 PM					69		69			75		75	144	144	
11:15 AM - 12:15 PM					57		57			87		87	144	144	
11:30 AM - 12:30 PM					78		78			99		99	177	177	
11:45 AM - 12:45 PM					74		74			91		91	165	165	
12:00 PM - 1:00 PM					78		78			85		85	163	163	
12:15 PM - 1:15 PM					81		81			77		77	158	158	
12:30 PM - 1:30 PM					67		67			72		72	139	139	
12:45 PM - 1:45 PM					71		71			79		79	150	150	
1:00 PM - 2:00 PM					55		55			80		80	135	135	
1:15 PM - 2:15 PM					72		72			78		78	150	150	
1:30 PM - 2:30 PM					73		73			87		87	160	160	
1:45 PM - 2:45 PM					76		76			78		78	154	154	
2:00 PM - 3:00 PM					88		88			81		81	169	169	

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McLean, Virginia

Pedestrian Volume Survey

PROJECT: North West & West Broad								
W + A JOB NO: 5897								
INTERSECTION: N. West St. & W & OD Trail								
LOCATION: Fairfax County, VA								
DATE: 9/14/2013								
DAY: Saturday								
WEATHER: clear								
COUNTED BY: Farid								
INPUTED BY: agan								
Time Period	Movement							
	1	2	3	4	5	6	7	8
15 Minute Volumes								
10:00 AM - 10:15 AM	23	15						
10:15 AM - 10:30 AM	16	19						
10:30 AM - 10:45 AM	14	17						
10:45 AM - 11:00 AM	15	28						
11:00 AM - 11:15 AM	12	16						
11:15 AM - 11:30 AM	14	9						
11:30 AM - 11:45 AM	9	17						
11:45 AM - 12:00 PM	6	4						
12:00 PM - 12:15 PM	9	9						
12:15 PM - 12:30 PM	14	15						
12:30 PM - 12:45 PM	14	4						
12:45 PM - 1:00 PM	5	8						
1:00 PM - 1:15 PM	9	9						
1:15 PM - 1:30 PM	6	3						
1:30 PM - 1:45 PM	12	3						
1:45 PM - 2:00 PM	7	4						
2:00 PM - 2:15 PM	5	3						
2:15 PM - 2:30 PM	4	4						
2:30 PM - 2:45 PM	5	14						
2:45 PM - 3:00 PM	4	5						
Total	203	206	0	0	0	0	0	0
One Hour Volumes								
10:00 AM - 11:00 AM	68	79						
10:15 AM - 11:15 AM	57	80						
10:30 AM - 11:30 AM	55	70						
10:45 AM - 11:45 AM	50	70						
11:00 AM - 12:00 PM	41	46						
11:15 AM - 12:15 PM	38	39						
11:30 AM - 12:30 PM	38	45						
11:45 AM - 12:45 PM	43	32						
12:00 PM - 1:00 PM	42	36						
12:15 PM - 1:15 PM	42	36						
12:30 PM - 1:30 PM	34	24						
12:45 PM - 1:45 PM	32	23						
1:00 PM - 2:00 PM	34	19						
1:15 PM - 2:15 PM	30	13						
1:30 PM - 2:30 PM	28	14						
1:45 PM - 2:45 PM	21	25						
2:00 PM - 3:00 PM	18	26						

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Turning Movement Count - Total Vehicles

PROJECT: North West & West Broad				DATE: 9/12/2013				SOUTHBOUND ROAD: Birch Street													
W+A JOB NO: 5897				DAY: Thursday				NORTHBOUND ROAD: 0													
INTERSECTION: W. Broad St. & Birch St.				WEATHER: clear				WESTBOUND ROAD: West Broad Street - 7													
LOCATION: Fairfax County,VA				COUNTED BY: Majda & Luz				EASTBOUND ROAD: West Broad Street - 7													
INPUTED BY: agan																					
Time Period	Southbound Birch Street				Westbound West Broad Street - 7				Northbound 0												
	Right	Thru	Left	Total	PHF	Right	Thru	Left	Total	PHF	Right	Thru									
15 Minute Volumes																					
6:00 AM - 6:15 AM	4	3	7			1	55	56			93	5	98		7	154	161				
6:15 AM - 6:30 AM	8	5	13			2	91	93			132	8	140		13	233	246				
6:30 AM - 6:45 AM	5	12	17			6	141	147			225	10	235		17	382	399				
6:45 AM - 7:00 AM	3	5	8			8	154	162			181	4	185		8	347	355				
7:00 AM - 7:15 AM	4	6	10			10	227	237			218	11	229		10	466	476				
7:15 AM - 7:30 AM	11	11	22			13	249	262			325	17	342		22	604	626				
7:30 AM - 7:45 AM	5	13	18			21	285	306			385	18	403		18	709	727				
7:45 AM - 8:00 AM	13	15	28			13	365	378			297	19	316		28	694	722				
8:00 AM - 8:15 AM	7	17	24			16	281	297			297	22	319		24	616	640				
8:15 AM - 8:30 AM	11	16	27			8	270	278			285	16	301		27	579	606				
8:30 AM - 8:45 AM	14	13	27			10	304	314			274	7	281		27	595	622				
8:45 AM - 9:00 AM	8	15	23			12	269	281			266	13	279		23	560	583				
2:30 PM - 2:45 PM	10	23	33			13	242	255			247	20	267		33	522	555				
2:45 PM - 3:00 PM	11	26	37			14	231	245			279	29	308		37	553	590				
3:00 PM - 3:15 PM	8	44	52			15	242	257			251	21	272		52	529	581				
3:15 PM - 3:30 PM	10	30	40			11	247	258			269	27	296		40	554	594				
3:30 PM - 3:45 PM	12	21	33			12	249	261			263	19	282		33	543	576				
3:45 PM - 4:00 PM	14	24	38			18	253	271			395	26	421		38	692	730				
4:00 PM - 4:15 PM	21	24	45			17	280	297			349	19	368		45	665	710				
4:15 PM - 4:30 PM	8	38	46			9	252	261			338	41	379		46	640	686				
4:30 PM - 4:45 PM	18	27	45			19	275	294			329	17	346		45	640	685				
4:45 PM - 5:00 PM	8	29	37			10	259	269			382	27	409		37	678	715				
5:00 PM - 5:15 PM	13	34	47			12	267	279			357	31	388		47	667	714				
5:15 PM - 5:30 PM	10	27	37			6	251	257			321	21	342		37	599	636				
5:30 PM - 5:45 PM	16	18	34			16	265	281			360	16	376		34	657	691				
5:45 PM - 6:00 PM	27	32	59			7	261	268			327	27	354		59	622	681				
6:00 PM - 6:15 PM	11	32	43			14	284	298			341	20	361		43	659	702				
6:15 PM - 6:30 PM	20	27	47			17	233	250			325	26	351		47	601	648				
6:30 PM - 6:45 PM	25	21	46			19	203	222			352	29	381		46	603	649				
6:45 PM - 7:00 PM	14	20	34			14	243	257			340	32	372		34	629	663				
Total	349	0	628	977		363	7228	0	7591		0	0	0	0	0	8803	598	9401	977	16992	17969
One Hour Volumes																					
6:00 AM - 7:00 AM	20	25	45	0.6618	17	441	458	0.7068			631	27	658	0.7	45	1116	1161				
6:15 AM - 7:15 AM	20	28	48	0.7059	26	613	639	0.6741			756	33	789	0.8394	48	1428	1476				
6:30 AM - 7:30 AM	23	34	57	0.6477	37	771	808	0.771			949	42	991	0.7244	57	1799	1856				
6:45 AM - 7:45 AM	23	35	58	0.6591	52	915	967	0.79			1109	50	1159	0.719	58	2126	2184				
7:00 AM - 8:00 AM	33	45	78	0.6964	57	1126	1183	0.7824			1225	65	1290	0.8002	78	2473	2551				
7:15 AM - 8:15 AM	36	56	92	0.8214	63	1180	1243	0.8221			1304	76	1380	0.8561	92	2623	2715				
7:30 AM - 8:30 AM	36	61	97	0.8661	58	1201	1259	0.8327			1264	75	1339	0.8306	97	2598	2695				
7:45 AM - 8:45 AM	45	61	106	0.9464	47	1220	1267	0.838			1153	64	1217	0.9538	106	2484	2590				
8:00 AM - 9:00 AM	40	61	101	0.9352	46	1124	1170	0.9315			1122	58	1180	0.9248	101	2350	2451				
2:30 PM - 3:00 PM	39	123	162	0.7788	53	962	1015	0.9835			1046	97	1143	0.9278	162	2158	2320				
2:45 PM - 3:45 PM	41	121	162	0.7788	52	969	1021	0.978			1062	96	1158	0.9399	162	2179	2341				
3:00 PM - 4:00 PM	44	119	163	0.7837	56	991	1047	0.9659			1178	93	1271	0.7548	163	2318	2481				
3:15 PM - 4:15 PM	57	99	156	0.8667	58	1029	1087	0.915			1276	91	1367	0.8118	156	2454	2610				
3:30 PM - 4:30 PM	55	107	162	0.8804	56	1034	1090	0.9175			1345	105	1450	0.861	162	2540	2702				
3:45 PM - 4:45 PM	61	113	174	0.9457	63	1060	1123	0.9453			1411	103	1514	0.899	174	2637	2811				
4:00 PM - 5:00 PM	55	118	173	0.9402	55	1066	1121	0.9436			1398	104	1502	0.9181	173	2623	2796				
4:15 PM - 5:15 PM	47	128	175	0.9309	50	1053	1103	0.9379			1406	116	1522	0.9303	175	2625	2800				
4:30 PM - 5:30 PM	49	117	166	0.883	47	1052	1099	0.9345			1389	96	1485	0.9077	166	2584	2750				
4:45 PM - 5:45 PM	47	108	155	0.8245	44	1042	1086	0.9662			1420	95	1515	0.926	155	2601	2756				
5:00 PM - 6:00 PM	66	111	177	0.75	41	1044	1085	0.9653			1365	95	1460	0.9407	177	2545	2722				
5:15 PM - 6:15 PM	64	109	173	0.7331	43	1061	1104	0.9262			1349	84	1433	0.9528	173	2537	2710				
5:30 PM - 6:30 PM	74	109	183	0.7754	54	1043	1097	0.9203			1353	89	1442	0.9588	183	2539	2722				
5:45 PM - 6:45 PM	83	112	195	0.8263	57	981	1038	0.8708			1345	102	1447	0.9495	195	2485	2680				
6:00 PM - 7:00 PM	70	100	170	0.9043	64	963	1027	0.8616			1358	107	1465	0.9613	170	2492	2662				

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McLean, Virginia

Pedestrian Volume Survey

PROJECT:	North West & West Broad												
W + A JOB NO:	5897												
INTERSECTION:	W. Broad St. & Birch St.												
LOCATION:	Fairfax County, VA												
DATE:	9/12/2013												
DAY:	Thursday												
WEATHER:	clear												
COUNTED BY:	Luz												
INPUTED BY:	agan												
Time Period	Movement												
	1	2	3	4	5	6	7	8	I + 2	3 + 4	5 + 6	7 + 8	Total
15 Minute Volumes													
6:00 AM - 6:15 AM	I								I				
6:15 AM - 6:30 AM	I							4					
6:30 AM - 6:45 AM	2	I					3	I					
6:45 AM - 7:00 AM	I						3						
7:00 AM - 7:15 AM	2	4			5	I	5						
7:15 AM - 7:30 AM	I				3	3							
7:30 AM - 7:45 AM	2				3	5	I	2					
7:45 AM - 8:00 AM					3	5	4	I					
8:00 AM - 8:15 AM	I	I			2	6	2	I					
8:15 AM - 8:30 AM	I		2	2	4	3	4						
8:30 AM - 8:45 AM					I	I	4						
8:45 AM - 9:00 AM	I	I	3	2	2	3	3						
2:30 PM - 2:45 PM	2				3	4	2						
2:45 PM - 3:00 PM	I				3	3	I	I					
3:00 PM - 3:15 PM	I				4	4			6				
3:15 PM - 3:30 PM	2				5	3	2	I					
3:30 PM - 3:45 PM	I				3	3	I	2					
3:45 PM - 4:00 PM	I				3	2	4						
4:00 PM - 4:15 PM	I	I	2	2	4	I	I						
4:15 PM - 4:30 PM	I				I	2	I	4					
4:30 PM - 4:45 PM					3	I	I						
4:45 PM - 5:00 PM	I				5								
5:00 PM - 5:15 PM	I				2	I	2						
5:15 PM - 5:30 PM	I				I	I	I						
5:30 PM - 5:45 PM	I				2	I	I	I					
5:45 PM - 6:00 PM	I				I	I	3	I					
6:00 PM - 6:15 PM	I	I			3			I					
6:15 PM - 6:30 PM	I	I			4	I	I						
6:30 PM - 6:45 PM	I				I	I	I						
6:45 PM - 7:00 PM					I	2	2						
Total	25	14	2	7	68	70	45	32					
One Hour Volumes													
6:00 AM - 7:00 AM	5	I			10	I	I		6	10	2	18	
6:15 AM - 7:15 AM	6	5			5	11	6		11	16	6	33	
6:30 AM - 7:30 AM	5	6			8	10	6		11	18	6	35	
6:45 AM - 7:45 AM	3	7			11	12	6	2	10	23	8	41	
7:00 AM - 8:00 AM	2	7			14	14	10	3	9	28	13	50	
7:15 AM - 8:15 AM	I	3	I		11	19	7	4	4	I	30	11	46
7:30 AM - 8:30 AM	I	3	I	2	10	20	10	8	4	3	30	18	55
7:45 AM - 8:45 AM	I	I	I	2	8	16	13	6	2	3	24	19	48
8:00 AM - 9:00 AM	2	2	I	5	7	13	12	8	4	6	20	20	50
2:30 PM - 3:30 PM	6				15	14	5	8	6	29	13	48	
2:45 PM - 3:45 PM	5				15	13	4	10	5	28	14	47	
3:00 PM - 4:00 PM	5				15	12	7	9	5	27	16	48	
3:15 PM - 4:15 PM	4	I	I	2	13	12	8	4	5	3	25	12	45
3:30 PM - 4:30 PM	3	I	I	2	9	11	7	7	4	3	20	14	41
3:45 PM - 4:45 PM	2	I	I	2	9	9	7	5	3	3	18	12	36
4:00 PM - 5:00 PM	2	I	I	2	11	7	3	5	3	3	18	8	32
4:15 PM - 5:15 PM	3				11	4	4	4	3	15	8	26	
4:30 PM - 5:30 PM	2	I			11	2	4		3	13	4	24	
4:45 PM - 5:45 PM	3	I			10	2	4	I	4	12	5	21	
5:00 PM - 6:00 PM	3	I			6	3	7	2	4	9	9	22	
5:15 PM - 6:15 PM	3	2			7	2	5	3	5	9	8	22	
5:30 PM - 6:30 PM	4	2			10	3	5	3	6	13	8	27	
5:45 PM - 6:45 PM	4	2			9	3	5	2	6	12	7	25	
6:00 PM - 7:00 PM	3	2			9	4	2	3	5	13	5	23	

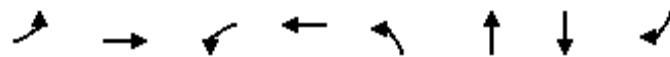
Appendix D

Existing Conditions Synchro Analysis

Queues

1: Route 7 & N West St.

8/26/2014



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	253	1044	36	1049	254	345	155	160
V/c Ratio	1.09	0.69	0.17	0.80	0.77	1.01	0.57	0.34
Control Delay	100.4	24.8	20.8	42.5	63.1	98.1	54.7	17.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	100.4	24.8	20.8	42.5	63.1	98.1	54.7	17.9
Queue Length 50th (ft)	~155	374	15	455	189	~269	107	43
Queue Length 95th (ft)	#321	474	m26	#534	#281	#424	165	91
Internal Link Dist (ft)		1468			871		431	199
Turn Bay Length (ft)	175		165		250			
Base Capacity (vph)	232	1518	269	1317	328	343	340	472
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.09	0.69	0.13	0.80	0.77	1.01	0.46	0.34

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

1: Route 7 & N West St.

8/26/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑		↑	↑↑		↑	↑		↑	↑	↑
Volume (vph)	233	906	54	33	906	48	216	260	33	37	94	136
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11	11	11	11	11	11	11
Total Lost time (s)	4.5	6.0		4.5	6.0		5.0	5.0			5.0	5.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00			1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Fr _t	1.00	0.99		1.00	0.99		1.00	0.98			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.99	1.00
Satd. Flow (prot)	1711	3238		1710	3237		1711	1767			1775	1531
Flt Permitted	0.12	1.00		0.18	1.00		0.95	1.00			0.99	1.00
Satd. Flow (perm)	214	3238		319	3237		1711	1767			1775	1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.91	0.91	0.91	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	253	985	59	36	996	53	254	306	39	44	111	160
RTOR Reduction (vph)	0	3	0	0	3	0	0	4	0	0	0	60
Lane Group Flow (vph)	253	1041	0	36	1046	0	254	341	0	0	155	100
Confl. Peds. (#/hr)	8		2	2		8	7		2	2		7
Heavy Vehicles (%)	2%	7%	2%	2%	7%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	4	0	0	0	0	0	0	0	0	0
Turn Type	pm+pt			pm+pt			Split			Split		pt+ov
Protected Phases	5	2		1	6		3	3		4	4	45
Permitted Phases				6								
Actuated Green, G (s)	62.7	54.3		52.6	48.7		23.0	23.0			18.3	32.8
Effective Green, g (s)	62.7	54.3		52.6	48.7		23.0	23.0			18.3	32.8
Actuated g/C Ratio	0.52	0.45		0.44	0.41		0.19	0.19			0.15	0.27
Clearance Time (s)	4.5	6.0		4.5	6.0		5.0	5.0			5.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0			2.0	
Lane Grp Cap (vph)	230	1465		185	1314		328	339			271	418
v/s Ratio Prot	c0.09	0.32		0.01	0.32		0.15	c0.19			c0.09	0.07
v/s Ratio Perm	c0.49			0.08								
v/c Ratio	1.10	0.71		0.19	0.80		0.77	1.01			0.57	0.24
Uniform Delay, d1	24.9	26.5		20.7	31.3		46.0	48.5			47.2	33.9
Progression Factor	0.69	0.82		1.25	1.18		1.00	1.00			1.00	1.00
Incremental Delay, d2	83.6	2.5		0.2	4.2		10.0	50.3			1.8	0.1
Delay (s)	100.6	24.1		26.0	41.0		56.0	98.8			49.0	34.0
Level of Service	F	C		C	D		E	F			D	C
Approach Delay (s)	39.0			40.5			80.7				41.4	
Approach LOS	D			D			F				D	
Intersection Summary												
HCM Average Control Delay	47.3						HCM Level of Service			D		
HCM Volume to Capacity ratio	0.95											
Actuated Cycle Length (s)	120.0						Sum of lost time (s)			14.5		
Intersection Capacity Utilization	83.1%						ICU Level of Service			E		
Analysis Period (min)	15											
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

2: Grove St. & N West St.

8/26/2014



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	62	22	9	485	246	55
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.85	0.85	0.89	0.89	0.88	0.88
Hourly flow rate (vph)	73	26	10	545	280	62
Pedestrians				1		
Lane Width (ft)				12.0		
Walking Speed (ft/s)				4.0		
Percent Blockage				0		
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				279	784	
pX, platoon unblocked	0.75					
vC, conflicting volume	876	172	342			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	664	172	342			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	75	97	99			
cM capacity (veh/h)	291	841	1214			
Direction, Lane #	EB 1	NB 1	SB 1	SB 2		
Volume Total	99	555	186	156		
Volume Left	73	10	0	0		
Volume Right	26	0	0	62		
cSH	352	1214	1700	1700		
Volume to Capacity	0.28	0.01	0.11	0.09		
Queue Length 95th (ft)	28	1	0	0		
Control Delay (s)	19.2	0.2	0.0	0.0		
Lane LOS	C	A				
Approach Delay (s)	19.2	0.2	0.0			
Approach LOS	C					
Intersection Summary						
Average Delay			2.0			
Intersection Capacity Utilization		44.5%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis

3: Park Ave. & N West St.

8/26/2014

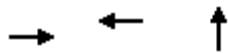


Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	172	33	450	126	27	158
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.85	0.85	0.90	0.90	0.85	0.85
Hourly flow rate (vph)	202	39	500	140	32	186
Pedestrians	2					
Lane Width (ft)	12.0					
Walking Speed (ft/s)	4.0					
Percent Blockage	0					
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			580			483
pX, platoon unblocked	0.80	0.80		0.80		
vC, conflicting volume	821	572		642		
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	648	335		423		
tC, single (s)	6.4	6.2		4.1		
tC, 2 stage (s)						
tF (s)	3.5	3.3		2.2		
p0 queue free %	39	93		96		
cM capacity (veh/h)	334	562		904		
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	241	640	218			
Volume Left	202	0	32			
Volume Right	39	140	0			
cSH	357	1700	904			
Volume to Capacity	0.68	0.38	0.04			
Queue Length 95th (ft)	118	0	3			
Control Delay (s)	33.7	0.0	1.6			
Lane LOS	D		A			
Approach Delay (s)	33.7	0.0	1.6			
Approach LOS	D					
Intersection Summary						
Average Delay			7.7			
Intersection Capacity Utilization		49.6%		ICU Level of Service		A
Analysis Period (min)		15				

Queues

4: Route 7 & N Spring St.

8/26/2014



Lane Group	EBT	WBT	NBT
Lane Group Flow (vph)	1105	1228	120
V/c Ratio	0.56	0.58	0.34
Control Delay	17.7	8.7	20.1
Queue Delay	0.0	0.0	0.0
Total Delay	17.7	8.7	20.1
Queue Length 50th (ft)	437	101	35
Queue Length 95th (ft)	m508	203	61
Internal Link Dist (ft)	871	625	201
Turn Bay Length (ft)			
Base Capacity (vph)	1969	2102	539
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.56	0.58	0.22

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

4: Route 7 & N Spring St.

8/26/2014

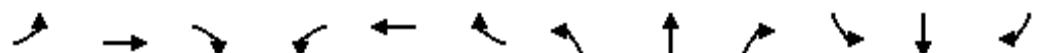


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	35	949	22	14	985	45	15	68	19	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11	12	15	12	12	12	12
Total Lost time (s)					6.0				6.0			
Lane Util. Factor		0.95				0.95			1.00			
Frpb, ped/bikes		1.00				1.00			1.00			
Flpb, ped/bikes		1.00				1.00			1.00			
Fr _t		1.00				0.99			0.98			
Flt Protected		1.00				1.00			0.99			
Satd. Flow (prot)		3251				3243			1970			
Flt Permitted		0.87				0.93			0.99			
Satd. Flow (perm)		2844				3033			1970			
Peak-hour factor, PHF	0.91	0.91	0.91	0.85	0.85	0.85	0.85	0.85	0.85	0.92	0.92	0.92
Adj. Flow (vph)	38	1043	24	16	1159	53	18	80	22	0	0	0
RTOR Reduction (vph)	0	2	0	0	4	0	0	15	0	0	0	0
Lane Group Flow (vph)	0	1103	0	0	1224	0	0	105	0	0	0	0
Confl. Peds. (#/hr)	10		13	13		10	15		9	9		15
Heavy Vehicles (%)	2%	7%	2%	2%	7%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	4	0	0	4	0	0	0	0	0	0
Turn Type	Perm			Perm			Perm					
Protected Phases		2			2			4				
Permitted Phases	2			2			4					
Actuated Green, G (s)	39.1			39.1			8.9					
Effective Green, g (s)	39.1			39.1			8.9					
Actuated g/C Ratio	0.65			0.65			0.15					
Clearance Time (s)	6.0			6.0			6.0					
Vehicle Extension (s)	1.5			1.5			2.0					
Lane Grp Cap (vph)	1853			1977			292					
v/s Ratio Prot												
v/s Ratio Perm	0.39			c0.40			0.05					
v/c Ratio	0.60			0.62			0.36					
Uniform Delay, d1	5.9			6.1			23.0					
Progression Factor	2.45			1.00			1.00					
Incremental Delay, d2	1.0			1.5			0.3					
Delay (s)	15.6			7.6			23.3					
Level of Service	B			A			C					
Approach Delay (s)	15.6			7.6			23.3			0.0		
Approach LOS	B			A			C			A		
Intersection Summary												
HCM Average Control Delay	12.0			HCM Level of Service			B					
HCM Volume to Capacity ratio	0.57											
Actuated Cycle Length (s)	60.0			Sum of lost time (s)			12.0					
Intersection Capacity Utilization	74.9%			ICU Level of Service			D					
Analysis Period (min)		15										
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

5: Park Ave. & N Spring St.

8/26/2014



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	14	128	0	0	191	30	19	43	95	20	0	18
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	16	151	0	0	225	35	22	51	112	24	0	21
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	167	260	185	45								
Volume Left (vph)	16	0	22	24								
Volume Right (vph)	0	35	112	21								
Hadj (s)	0.05	-0.05	-0.30	-0.14								
Departure Headway (s)	4.8	4.6	4.7	5.1								
Degree Utilization, x	0.22	0.34	0.24	0.06								
Capacity (veh/h)	692	735	707	632								
Control Delay (s)	9.3	10.0	9.2	8.4								
Approach Delay (s)	9.3	10.0	9.2	8.4								
Approach LOS	A	A	A	A								
Intersection Summary												
Delay					9.4							
HCM Level of Service					A							
Intersection Capacity Utilization				35.2%		ICU Level of Service					A	
Analysis Period (min)					15							

Queues

6: Lincoln Ave. & N West St.

8/26/2014



Lane Group	EBT	WBT	NBT	NBR	SBT
Lane Group Flow (vph)	14	65	314	211	159
V/c Ratio	0.13	0.40	0.21	0.17	0.11
Control Delay	32.8	45.6	4.6	1.2	4.3
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	32.8	45.6	4.6	1.2	4.3
Queue Length 50th (ft)	4	36	39	0	18
Queue Length 95th (ft)	22	71	127	26	65
Internal Link Dist (ft)	413	1025	252		266
Turn Bay Length (ft)				150	
Base Capacity (vph)	311	481	1491	1249	1445
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.05	0.14	0.21	0.17	0.11

Intersection Summary

HCM Signalized Intersection Capacity Analysis

6: Lincoln Ave. & N West St.

8/26/2014



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	5	7	44	4	7	1	288	194	11	134	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)								6.0	6.0			6.0
Lane Util. Factor								1.00	1.00			1.00
Frpb, ped/bikes								1.00	0.97			1.00
Flpb, ped/bikes								1.00	1.00			1.00
Fr _t								0.92	0.98			1.00
Flt Protected								1.00	0.96			1.00
Satd. Flow (prot)								1571	1761			1853
Flt Permitted								1.00	0.96			0.97
Satd. Flow (perm)								1571	1761			1808
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	6	8	52	5	8	1	313	211	12	146	1
RTOR Reduction (vph)	0	8	0	0	6	0	0	0	57	0	0	0
Lane Group Flow (vph)	0	6	0	0	59	0	0	314	154	0	159	0
Confl. Peds. (#/hr)					4	4		12		21	21	12
Turn Type	Split			Split			Perm		Perm	Perm		
Protected Phases	1	1		3	3			2				2
Permitted Phases								2		2	2	
Actuated Green, G (s)		1.5			7.7			72.8	72.8			72.8
Effective Green, g (s)		1.5			7.7			72.8	72.8			72.8
Actuated g/C Ratio		0.02			0.08			0.73	0.73			0.73
Clearance Time (s)		6.0			6.0			6.0	6.0			6.0
Vehicle Extension (s)		3.0			3.0			3.0	3.0			3.0
Lane Grp Cap (vph)		24			136			1356	1113			1316
v/s Ratio Prot	c0.00			c0.03								
v/s Ratio Perm								0.17	0.10			0.09
v/c Ratio		0.26			0.43			0.23	0.14			0.12
Uniform Delay, d1		48.7			44.1			4.4	4.1			4.1
Progression Factor		1.00			1.00			1.00	1.00			1.00
Incremental Delay, d2		5.6			2.2			0.4	0.3			0.2
Delay (s)		54.3			46.2			4.8	4.4			4.2
Level of Service		D			D			A	A			A
Approach Delay (s)		54.3			46.2			4.7				4.2
Approach LOS		D			D			A				A
Intersection Summary												
HCM Average Control Delay		9.0			HCM Level of Service			A				
HCM Volume to Capacity ratio		0.25										
Actuated Cycle Length (s)		100.0			Sum of lost time (s)			18.0				
Intersection Capacity Utilization		46.9%			ICU Level of Service			A				
Analysis Period (min)		15										

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

7: W&OD Trail & Grove St.

8/26/2014



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	0	0	0	0	64	0	0	84	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	0	0	0	0	70	0	0	91	0
Pedestrians								25			31	
Lane Width (ft)								12.0			12.0	
Walking Speed (ft/s)								4.0			4.0	
Percent Blockage								2			3	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	192	161	116	186	161	101	91			70		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	192	161	116	186	161	101	91			70		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	100	100	100	100			100		
cM capacity (veh/h)	748	731	916	759	731	930	1504			1531		
Direction, Lane #	NB 1	SB 1										
Volume Total	70	91										
Volume Left	0	0										
Volume Right	0	0										
cSH	1700	1700										
Volume to Capacity	0.04	0.05										
Queue Length 95th (ft)	0	0										
Control Delay (s)	0.0	0.0										
Lane LOS												
Approach Delay (s)	0.0	0.0										
Approach LOS												
Intersection Summary												
Average Delay		0.0										
Intersection Capacity Utilization		7.8%		ICU Level of Service					A			
Analysis Period (min)		15										

HCM Unsignalized Intersection Capacity Analysis

8: W&OD Trail & N West St.

8/26/2014



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	0	0	0	0	483	0	0	185	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	0	0	0	0	525	0	0	201	0
Pedestrians								27			32	
Lane Width (ft)								12.0			12.0	
Walking Speed (ft/s)								4.0			4.0	
Percent Blockage								2			3	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								731			332	
pX, platoon unblocked	0.97	0.97		0.97	0.97	0.97					0.97	
vC, conflicting volume	758	726	228	753	726	557	201				525	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	734	701	228	729	701	527	201				494	
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1				4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2				2.2	
p0 queue free %	100	100	100	100	100	100	100				100	
cM capacity (veh/h)	317	352	793	320	352	520	1371				1037	
Direction, Lane #	NB 1	SB 1										
Volume Total	525	201										
Volume Left	0	0										
Volume Right	0	0										
cSH	1700	1700										
Volume to Capacity	0.31	0.12										
Queue Length 95th (ft)	0	0										
Control Delay (s)	0.0	0.0										
Lane LOS												
Approach Delay (s)	0.0	0.0										
Approach LOS												
Intersection Summary												
Average Delay			0.0									
Intersection Capacity Utilization		28.8%		ICU Level of Service				A				
Analysis Period (min)		15										

Queues

9: Route 7 & Birch St.

8/26/2014



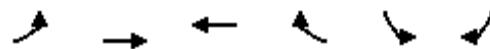
Lane Group	EBL	EBT	WBT	SBL
Lane Group Flow (vph)	88	1487	1481	111
v/c Ratio	0.36	0.58	0.66	0.47
Control Delay	8.3	7.6	10.8	43.4
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	8.3	7.6	10.8	43.4
Queue Length 50th (ft)	17	264	487	61
Queue Length 95th (ft)	30	288	517	113
Internal Link Dist (ft)		310	1468	305
Turn Bay Length (ft)	300			
Base Capacity (vph)	282	2582	2250	327
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.31	0.58	0.66	0.34

Intersection Summary

HCM Signalized Intersection Capacity Analysis

9: Route 7 & Birch St.

8/26/2014



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	75	1264	1201	58	61	36
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		6.0	
Lane Util. Factor	1.00	0.95	0.95		1.00	
Frpb, ped/bikes	1.00	1.00	1.00		0.98	
Flpb, ped/bikes	1.00	1.00	1.00		1.00	
Fr _t	1.00	1.00	0.99		0.95	
Fl _t Protected	0.95	1.00	1.00		0.97	
Satd. Flow (prot)	1770	3347	3353		1689	
Fl _t Permitted	0.12	1.00	1.00		0.97	
Satd. Flow (perm)	214	3347	3353		1689	
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.87	0.87
Adj. Flow (vph)	88	1487	1413	68	70	41
RTOR Reduction (vph)	0	0	2	0	19	0
Lane Group Flow (vph)	88	1487	1479	0	92	0
Confl. Peds. (#/hr)	4			4	3	18
Heavy Vehicles (%)	2%	7%	7%	2%	2%	2%
Bus Blockages (#/hr)	0	4	0	0	0	0
Turn Type	pm+pt					
Protected Phases	5	2	6		4	
Permitted Phases	2					
Actuated Green, G (s)	92.6	92.6	80.5		15.4	
Effective Green, g (s)	92.6	92.6	80.5		15.4	
Actuated g/C Ratio	0.77	0.77	0.67		0.13	
Clearance Time (s)	6.0	6.0	6.0		6.0	
Vehicle Extension (s)	2.0	2.0	2.0		2.0	
Lane Grp Cap (vph)	244	2583	2249		217	
v/s Ratio Prot	0.02	c0.44	c0.44		c0.05	
v/s Ratio Perm	0.26					
v/c Ratio	0.36	0.58	0.66		0.42	
Uniform Delay, d1	8.5	5.6	11.6		48.2	
Progression Factor	1.00	1.00	0.74		1.00	
Incremental Delay, d2	0.3	0.9	1.1		0.5	
Delay (s)	8.8	6.6	9.7		48.7	
Level of Service	A	A	A		D	
Approach Delay (s)		6.7	9.7		48.7	
Approach LOS		A	A		D	
Intersection Summary						
HCM Average Control Delay		9.6	HCM Level of Service		A	
HCM Volume to Capacity ratio		0.64				
Actuated Cycle Length (s)		120.0	Sum of lost time (s)		18.0	
Intersection Capacity Utilization		65.5%	ICU Level of Service		C	
Analysis Period (min)		15				
c Critical Lane Group						

HCM Unsignalized Intersection Capacity Analysis

10: Route 7 & N Oak St.

8/26/2014



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	38	1026	11	15	1055	63	29	14	19	4	3	76
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.91	0.91	0.92	0.92	0.85	0.85	0.92	0.92	0.92	0.85	0.92	0.85
Hourly flow rate (vph)	42	1127	12	16	1241	74	32	15	21	5	3	89
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)		705										
pX, platoon unblocked					0.87			0.87	0.87	0.87	0.87	0.87
vC, conflicting volume	1315				1139			1961	2565	570	1986	2534
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1315				857			1803	2499	200	1832	2463
tC, single (s)	4.1				4.1			7.5	6.5	6.9	7.5	6.5
tC, 2 stage (s)												
tF (s)	2.2				2.2			3.5	4.0	3.3	3.5	4.0
p0 queue free %	92				98			0	31	97	72	86
cM capacity (veh/h)	522				677			28	22	701	17	23
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1						
Volume Total	605	576	637	695	67	97						
Volume Left	42	0	16	0	32	5						
Volume Right	0	12	0	74	21	89						
cSH	522	1700	677	1700	36	151						
Volume to Capacity	0.08	0.34	0.02	0.41	1.85	0.64						
Queue Length 95th (ft)	6	0	2	0	183	89						
Control Delay (s)	2.3	0.0	0.7	0.0	639.1	63.9						
Lane LOS	A		A		F	F						
Approach Delay (s)	1.2		0.3		639.1	63.9						
Approach LOS					F	F						
Intersection Summary												
Average Delay			19.1									
Intersection Capacity Utilization		73.3%			ICU Level of Service				D			
Analysis Period (min)		15										

HCM Unsignalized Intersection Capacity Analysis

11: Park Ave. & N Oak St.

8/26/2014



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Sign Control		Stop			Stop			Stop			Stop		
Volume (vph)	32	187	49	13	132	11	46	48	34	17	13	68	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	
Hourly flow rate (vph)	38	220	58	15	155	13	54	56	40	20	15	80	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1									
Volume Total (vph)	315	184	151	115									
Volume Left (vph)	38	15	54	20									
Volume Right (vph)	58	13	40	80									
Hadj (s)	-0.05	0.01	-0.05	-0.35									
Departure Headway (s)	4.8	5.0	5.3	5.0									
Degree Utilization, x	0.42	0.26	0.22	0.16									
Capacity (veh/h)	706	662	609	632									
Control Delay (s)	11.3	9.8	9.7	9.0									
Approach Delay (s)	11.3	9.8	9.7	9.0									
Approach LOS	B	A	A	A									
Intersection Summary													
Delay	10.3												
HCM Level of Service	B												
Intersection Capacity Utilization	41.4%	ICU Level of Service				A							
Analysis Period (min)	15												

Queuing and Blocking Report

8/27/2014

Intersection: 5: Park Ave. & N Spring St.

Movement	EB	WB	NB	SB
Directions Served	LT	TR	LTR	LR
Maximum Queue (ft)	99	91	75	55
Average Queue (ft)	41	45	46	25
95th Queue (ft)	71	72	69	46
Link Distance (ft)	113	530	202	303
Upstream Blk Time (%)	0			
Queuing Penalty (veh)	0			
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 11: Park Ave. & N Oak St.

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	125	82	75	67
Average Queue (ft)	52	41	41	33
95th Queue (ft)	88	63	65	54
Link Distance (ft)	530	228	203	262
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

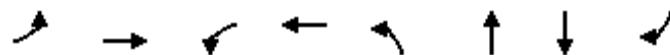
Network Summary

Network wide Queuing Penalty: 0

Queues

1: Route 7 & N West St.

8/26/2014



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	248	1218	96	996	160	244	422	239
V/c Ratio	0.96	0.86	0.54	0.74	0.58	0.85	1.28	0.53
Control Delay	74.6	34.1	34.0	34.3	58.7	76.0	189.4	13.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	74.6	34.1	34.0	34.3	58.7	76.0	189.4	13.3
Queue Length 50th (ft)	125	502	43	283	124	190	~450	19
Queue Length 95th (ft)	#305	#674	93	328	196	#303	#656	99
Internal Link Dist (ft)		1468		871		431	199	
Turn Bay Length (ft)	175		165		250			
Base Capacity (vph)	258	1411	210	1347	316	328	330	452
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.96	0.86	0.46	0.74	0.51	0.74	1.28	0.53

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

1: Route 7 & N West St.

8/26/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑		↑	↑↑		↑	↑		↑	↑	↑
Volume (vph)	228	1027	94	82	831	15	147	168	56	48	340	220
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11	11	11	11	11	11	11
Total Lost time (s)	4.5	6.0		4.5	6.0		5.0	5.0			5.0	5.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00			1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00			1.00	0.99
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Fr _t	1.00	0.99		1.00	1.00		1.00	0.96			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.99	1.00
Satd. Flow (prot)	1711	3233		1711	3255		1711	1726			1790	1510
Flt Permitted	0.14	1.00		0.09	1.00		0.95	1.00			0.99	1.00
Satd. Flow (perm)	261	3233		170	3255		1711	1726			1790	1510
Peak-hour factor, PHF	0.92	0.92	0.92	0.85	0.85	0.85	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	248	1116	102	96	978	18	160	183	61	52	370	239
RTOR Reduction (vph)	0	5	0	0	1	0	0	9	0	0	0	173
Lane Group Flow (vph)	248	1213	0	96	995	0	160	235	0	0	422	66
Confl. Peds. (#/hr)							1		2	2		1
Heavy Vehicles (%)	2%	7%	2%	2%	7%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	4	0	0	0	0	0	0	0	0	0
Turn Type	pm+pt			pm+pt			Split			Split		Perm
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases	2			6								4
Actuated Green, G (s)	67.4	56.6		61.8	53.8		20.9	20.9			24.0	24.0
Effective Green, g (s)	67.4	56.6		61.8	53.8		20.9	20.9			24.0	24.0
Actuated g/C Ratio	0.52	0.44		0.48	0.41		0.16	0.16			0.18	0.18
Clearance Time (s)	4.5	6.0		4.5	6.0		5.0	5.0			5.0	5.0
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0			2.0	2.0
Lane Grp Cap (vph)	256	1408		176	1347		275	277			330	279
v/s Ratio Prot	c0.08	0.38		0.03	0.31		0.09	c0.14			c0.24	
v/s Ratio Perm	c0.42			0.23								0.04
v/c Ratio	0.97	0.86		0.55	0.74		0.58	0.85			1.28	0.24
Uniform Delay, d1	23.5	33.2		24.0	32.2		50.5	53.0			53.0	45.2
Progression Factor	1.75	0.81		1.45	0.94		1.00	1.00			1.00	1.00
Incremental Delay, d2	41.8	6.0		1.6	3.1		2.0	19.9			146.8	0.2
Delay (s)	82.8	32.7		36.5	33.3		52.5	72.9			199.8	45.4
Level of Service	F	C		D	C		D	E			F	D
Approach Delay (s)	41.2			33.6			64.8				144.0	
Approach LOS	D			C			E				F	
Intersection Summary												
HCM Average Control Delay	60.3										E	
HCM Volume to Capacity ratio	1.02											
Actuated Cycle Length (s)	130.0										19.0	
Intersection Capacity Utilization	86.5%										E	
Analysis Period (min)	15											
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

2: Grove St. & N West St.

8/26/2014



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	83	22	33	365	570	51
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.89	0.89
Hourly flow rate (vph)	90	24	36	397	640	57
Pedestrians				3		
Lane Width (ft)				12.0		
Walking Speed (ft/s)				4.0		
Percent Blockage				0		
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				279	784	
pX, platoon unblocked	0.81					
vC, conflicting volume	1141	349	698			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1054	349	698			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	47	96	96			
cM capacity (veh/h)	171	647	894			
Direction, Lane #	EB 1	NB 1	SB 1	SB 2		
Volume Total	114	433	427	271		
Volume Left	90	36	0	0		
Volume Right	24	0	0	57		
cSH	202	894	1700	1700		
Volume to Capacity	0.57	0.04	0.25	0.16		
Queue Length 95th (ft)	76	3	0	0		
Control Delay (s)	43.8	1.2	0.0	0.0		
Lane LOS	E	A				
Approach Delay (s)	43.8	1.2	0.0			
Approach LOS	E					
Intersection Summary						
Average Delay		4.4				
Intersection Capacity Utilization		54.4%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis

3: Park Ave. & N West St.

8/26/2014

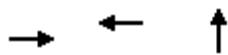


Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	159	29	349	121	41	474
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.85	0.85	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	187	34	379	132	45	515
Pedestrians	3					
Lane Width (ft)	12.0					
Walking Speed (ft/s)	4.0					
Percent Blockage	0					
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			580			483
pX, platoon unblocked	0.88	0.89			0.89	
vC, conflicting volume	1052	448			514	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	723	323			396	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	44	95			96	
cM capacity (veh/h)	332	640			1036	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	221	511	560			
Volume Left	187	0	45			
Volume Right	34	132	0			
cSH	359	1700	1036			
Volume to Capacity	0.62	0.30	0.04			
Queue Length 95th (ft)	98	0	3			
Control Delay (s)	29.9	0.0	1.2			
Lane LOS	D		A			
Approach Delay (s)	29.9	0.0	1.2			
Approach LOS	D					
Intersection Summary						
Average Delay			5.6			
Intersection Capacity Utilization		73.6%		ICU Level of Service		D
Analysis Period (min)		15				

Queues

4: Route 7 & N Spring St.

8/26/2014



Lane Group	EBT	WBT	NBT
Lane Group Flow (vph)	1301	1232	48
v/c Ratio	0.53	0.54	0.25
Control Delay	2.7	5.0	33.5
Queue Delay	0.0	0.0	0.0
Total Delay	2.7	5.0	33.5
Queue Length 50th (ft)	27	173	18
Queue Length 95th (ft)	m55	211	53
Internal Link Dist (ft)	871	625	201
Turn Bay Length (ft)			
Base Capacity (vph)	2459	2291	406
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.53	0.54	0.12

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

4: Route 7 & N Spring St.

8/26/2014



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	26	1160	11	37	1021	38	10	9	21	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11	12	15	12	12	12	12
Total Lost time (s)		6.0			6.0			6.0				
Lane Util. Factor		0.95			0.95			1.00				
Frpb, ped/bikes		1.00			1.00			0.99				
Flpb, ped/bikes		1.00			1.00			1.00				
Fr _t		1.00			0.99			0.93				
Flt Protected		1.00			1.00			0.99				
Satd. Flow (prot)		3257			3246			1860				
Flt Permitted		0.89			0.83			0.99				
Satd. Flow (perm)		2905			2705			1860				
Peak-hour factor, PHF	0.92	0.92	0.92	0.89	0.89	0.89	0.85	0.85	0.85	0.92	0.92	0.92
Adj. Flow (vph)	28	1261	12	42	1147	43	12	11	25	0	0	0
RTOR Reduction (vph)	0	0	0	0	1	0	0	23	0	0	0	0
Lane Group Flow (vph)	0	1301	0	0	1231	0	0	25	0	0	0	0
Confl. Peds. (#/hr)	1	6	6		1	2		3	3			2
Heavy Vehicles (%)	2%	7%	2%	2%	7%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	4	0	0	4	0	0	0	0	0	0
Turn Type	Perm			Perm			Perm					
Protected Phases		2			2			4				
Permitted Phases	2			2			4					
Actuated Green, G (s)	107.6			107.6			10.4					
Effective Green, g (s)	107.6			107.6			10.4					
Actuated g/C Ratio	0.83			0.83			0.08					
Clearance Time (s)	6.0			6.0			6.0					
Vehicle Extension (s)	1.5			1.5			2.0					
Lane Grp Cap (vph)	2404			2239			149					
v/s Ratio Prot												
v/s Ratio Perm	0.45			c0.45			0.01					
v/c Ratio	0.54			0.55			0.17					
Uniform Delay, d1	3.5			3.5			55.8					
Progression Factor	0.56			1.00			1.00					
Incremental Delay, d2	0.5			1.0			0.2					
Delay (s)	2.4			4.5			56.0					
Level of Service	A			A			E					
Approach Delay (s)	2.4			4.5			56.0		0.0			
Approach LOS	A			A			E			A		
Intersection Summary												
HCM Average Control Delay	4.4			HCM Level of Service			A					
HCM Volume to Capacity ratio	0.52											
Actuated Cycle Length (s)	130.0			Sum of lost time (s)			12.0					
Intersection Capacity Utilization	75.9%			ICU Level of Service			D					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

5: Park Ave. & N Spring St.

8/26/2014



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	18	162	0	0	178	9	13	18	36	20	0	18
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.86	0.86	0.86
Hourly flow rate (vph)	21	191	0	0	209	11	15	21	42	23	0	21
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	212	220	79	44								
Volume Left (vph)	21	0	15	23								
Volume Right (vph)	0	11	42	21								
Hadj (s)	0.05	0.01	-0.25	-0.14								
Departure Headway (s)	4.5	4.5	4.7	4.9								
Degree Utilization, x	0.27	0.27	0.10	0.06								
Capacity (veh/h)	771	774	696	665								
Control Delay (s)	9.1	9.1	8.2	8.2								
Approach Delay (s)	9.1	9.1	8.2	8.2								
Approach LOS	A	A	A	A								
Intersection Summary												
Delay					8.9							
HCM Level of Service					A							
Intersection Capacity Utilization			35.7%			ICU Level of Service					A	
Analysis Period (min)					15							

Queues

6: Lincoln Ave. & N West St.

8/26/2014



Lane Group	EBT	WBT	NBT	NBR	SBT
Lane Group Flow (vph)	27	199	276	140	397
V/c Ratio	0.09	0.37	0.42	0.22	0.62
Control Delay	24.3	29.3	27.0	4.8	31.7
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	24.3	29.3	27.0	4.8	31.7
Queue Length 50th (ft)	8	98	132	0	207
Queue Length 95th (ft)	30	159	205	39	308
Internal Link Dist (ft)	413	1025	252		266
Turn Bay Length (ft)				150	
Base Capacity (vph)	311	542	651	637	644
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.09	0.37	0.42	0.22	0.62

Intersection Summary

HCM Signalized Intersection Capacity Analysis

6: Lincoln Ave. & N West St.

8/26/2014



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	13	10	160	11	6	8	243	127	19	345	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5				5.5			5.5	5.5			5.5
Lane Util. Factor	1.00				1.00			1.00	1.00			1.00
Frpb, ped/bikes	0.98				1.00			1.00	0.97			1.00
Flpb, ped/bikes	1.00				1.00			1.00	1.00			1.00
Fr _t	0.94				1.00			1.00	0.85			1.00
Flt Protected	1.00				0.96			1.00	1.00			1.00
Satd. Flow (prot)	1718				1774			1860	1539			1857
Flt Permitted	1.00				0.96			0.98	1.00			0.97
Satd. Flow (perm)	1718				1774			1834	1539			1813
Peak-hour factor, PHF	0.85	0.85	0.85	0.89	0.89	0.89	0.91	0.91	0.91	0.92	0.92	0.92
Adj. Flow (vph)	0	15	12	180	12	7	9	267	140	21	375	1
RTOR Reduction (vph)	0	10	0	0	1	0	0	0	90	0	0	0
Lane Group Flow (vph)	0	17	0	0	198	0	0	276	50	0	397	0
Confl. Peds. (#/hr)				8	8				6	6		
Turn Type	Split			Split			Perm		Perm	Perm		
Protected Phases	1	1		3	3			2			2	
Permitted Phases							2		2	2		
Actuated Green, G (s)	17.5			30.5			35.5	35.5			35.5	
Effective Green, g (s)	17.5			30.5			35.5	35.5			35.5	
Actuated g/C Ratio	0.18			0.30			0.36	0.36			0.36	
Clearance Time (s)	5.5			5.5			5.5	5.5			5.5	
Lane Grp Cap (vph)	301			541			651	546			644	
v/s Ratio Prot	c0.01			c0.11								
v/s Ratio Perm							0.15	0.03			c0.22	
v/c Ratio	0.06			0.37			0.42	0.09			0.62	
Uniform Delay, d1	34.4			27.2			24.5	21.5			26.6	
Progression Factor	1.00			1.00			1.00	1.00			1.00	
Incremental Delay, d2	0.4			1.9			2.0	0.3			4.4	
Delay (s)	34.7			29.1			26.5	21.8			31.0	
Level of Service	C			C			C	C			C	
Approach Delay (s)	34.7			29.1			24.9				31.0	
Approach LOS	C			C			C				C	
Intersection Summary												
HCM Average Control Delay	28.3			HCM Level of Service			C					
HCM Volume to Capacity ratio	0.41											
Actuated Cycle Length (s)	100.0			Sum of lost time (s)			16.5					
Intersection Capacity Utilization	59.7%			ICU Level of Service			B					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

7: W&OD Trail & Grove St.

8/26/2014



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	0	0	0	0	84	0	0	105	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	0	0	0	0	91	0	0	114	0
Pedestrians								2			5	
Lane Width (ft)								12.0			12.0	
Walking Speed (ft/s)								4.0			4.0	
Percent Blockage								0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	210	205	116	207	205	96	114				91	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	210	205	116	207	205	96	114				91	
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1				4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2				2.2	
p0 queue free %	100	100	100	100	100	100	100				100	
cM capacity (veh/h)	744	691	935	749	691	956	1475				1504	
Direction, Lane #	NB 1	SB 1										
Volume Total	91	114										
Volume Left	0	0										
Volume Right	0	0										
cSH	1700	1700										
Volume to Capacity	0.05	0.07										
Queue Length 95th (ft)	0	0										
Control Delay (s)	0.0	0.0										
Lane LOS												
Approach Delay (s)	0.0	0.0										
Approach LOS												
Intersection Summary												
Average Delay		0.0										
Intersection Capacity Utilization		8.9%		ICU Level of Service					A			
Analysis Period (min)		15										

HCM Unsignalized Intersection Capacity Analysis

8: W&OD Trail & N West St.

8/26/2014



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	0	0	0	0	378	0	0	515	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	0	0	0	0	411	0	0	560	0
Pedestrians								3			3	
Lane Width (ft)								12.0			12.0	
Walking Speed (ft/s)								4.0			4.0	
Percent Blockage								0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								731			332	
pX, platoon unblocked	0.83	0.83	0.83	0.83	0.83	0.83	0.83					
vC, conflicting volume	974	971	563	974	971	414	560				411	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	865	861	369	865	861	414	365				411	
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1				4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2				2.2	
p0 queue free %	100	100	100	100	100	100	100				100	
cM capacity (veh/h)	227	243	559	227	243	637	989				1148	
Direction, Lane #	NB 1	SB 1										
Volume Total	411	560										
Volume Left	0	0										
Volume Right	0	0										
cSH	1700	1700										
Volume to Capacity	0.24	0.33										
Queue Length 95th (ft)	0	0										
Control Delay (s)	0.0	0.0										
Lane LOS												
Approach Delay (s)	0.0	0.0										
Approach LOS												
Intersection Summary												
Average Delay		0.0										
Intersection Capacity Utilization		30.4%		ICU Level of Service				A				
Analysis Period (min)		15										

Queues

9: Route 7 & Birch St.

8/26/2014



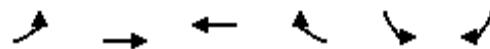
Lane Group	EBL	EBT	WBT	SBL
Lane Group Flow (vph)	103	1484	1180	209
V/c Ratio	0.32	0.58	0.53	0.77
Control Delay	7.3	8.6	24.6	65.8
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	7.3	8.6	24.6	65.8
Queue Length 50th (ft)	21	263	394	152
Queue Length 95th (ft)	43	380	507	213
Internal Link Dist (ft)		310	1468	305
Turn Bay Length (ft)	300			
Base Capacity (vph)	407	2540	2223	408
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.25	0.58	0.53	0.51

Intersection Summary

HCM Signalized Intersection Capacity Analysis

9: Route 7 & Birch St.

8/26/2014



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	95	1365	1044	41	111	66
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		6.0	
Lane Util. Factor	1.00	0.95	0.95		1.00	
Frpb, ped/bikes	1.00	1.00	1.00		0.99	
Flpb, ped/bikes	1.00	1.00	1.00		1.00	
Frt	1.00	1.00	0.99		0.95	
Flt Protected	0.95	1.00	1.00		0.97	
Satd. Flow (prot)	1770	3347	3356		1697	
Flt Permitted	0.18	1.00	1.00		0.97	
Satd. Flow (perm)	334	3347	3356		1697	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.85	0.85
Adj. Flow (vph)	103	1484	1135	45	131	78
RTOR Reduction (vph)	0	0	2	0	18	0
Lane Group Flow (vph)	103	1484	1178	0	191	0
Confl. Peds. (#/hr)	4			4		9
Heavy Vehicles (%)	2%	7%	7%	2%	2%	2%
Bus Blockages (#/hr)	0	4	0	0	0	0
Turn Type	pm+pt					
Protected Phases	5	2	6		4	
Permitted Phases	2					
Actuated Green, G (s)	98.6	98.6	86.0		19.4	
Effective Green, g (s)	98.6	98.6	86.0		19.4	
Actuated g/C Ratio	0.76	0.76	0.66		0.15	
Clearance Time (s)	6.0	6.0	6.0		6.0	
Vehicle Extension (s)	2.0	2.0	2.0		2.0	
Lane Grp Cap (vph)	326	2539	2220		253	
v/s Ratio Prot	0.02	c0.44	0.35		c0.11	
v/s Ratio Perm	0.22					
v/c Ratio	0.32	0.58	0.53		0.76	
Uniform Delay, d1	6.7	6.8	11.5		53.0	
Progression Factor	1.00	1.00	1.92		1.00	
Incremental Delay, d2	0.2	1.0	0.7		10.8	
Delay (s)	6.9	7.8	22.7		63.8	
Level of Service	A	A	C		E	
Approach Delay (s)		7.7	22.7		63.8	
Approach LOS		A	C		E	
Intersection Summary						
HCM Average Control Delay		17.6		HCM Level of Service		B
HCM Volume to Capacity ratio		0.61				
Actuated Cycle Length (s)		130.0		Sum of lost time (s)		12.0
Intersection Capacity Utilization		62.8%		ICU Level of Service		B
Analysis Period (min)		15				
c Critical Lane Group						

HCM Unsignalized Intersection Capacity Analysis

10: Route 7 & N Oak St.

8/26/2014



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	26	1255	31	28	1137	35	10	6	35	10	5	71
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.89	0.89	0.92	0.92	0.92	0.85	0.92	0.85
Hourly flow rate (vph)	28	1364	34	30	1278	39	11	7	38	12	5	84
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)		705										
pX, platoon unblocked					0.89			0.89	0.89	0.89	0.89	0.89
vC, conflicting volume	1317				1398			2223	2815	699	2138	2812
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1317				1205			2130	2793	422	2034	2790
tC, single (s)	4.1				4.1			7.5	6.5	6.9	7.5	6.5
tC, 2 stage (s)												
tF (s)	2.2				2.2			3.5	4.0	3.3	3.5	4.0
p0 queue free %	95				94			17	55	93	29	63
cM capacity (veh/h)	521				513			13	15	518	16	15
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1						
Volume Total	710	716	669	678	55	101						
Volume Left	28	0	30	0	11	12						
Volume Right	0	34	0	39	38	84						
cSH	521	1700	513	1700	41	78						
Volume to Capacity	0.05	0.42	0.06	0.40	1.36	1.29						
Queue Length 95th (ft)	4	0	5	0	139	193						
Control Delay (s)	1.6	0.0	1.7	0.0	418.4	293.8						
Lane LOS	A		A		F	F						
Approach Delay (s)	0.8		0.8		418.4	293.8						
Approach LOS					F	F						
Intersection Summary												
Average Delay			18.8									
Intersection Capacity Utilization		67.1%			ICU Level of Service			C				
Analysis Period (min)		15										

HCM Unsignalized Intersection Capacity Analysis

11: Park Ave. & N Oak St.

8/26/2014



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Sign Control		Stop			Stop			Stop			Stop		
Volume (vph)	17	188	37	17	188	14	9	27	38	35	24	11	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.86	0.86	0.86	
Hourly flow rate (vph)	20	221	44	20	221	16	11	32	45	41	28	13	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1									
Volume Total (vph)	285	258	87	81									
Volume Left (vph)	20	20	11	41									
Volume Right (vph)	44	16	45	13									
Hadj (s)	-0.04	0.01	-0.25	0.04									
Departure Headway (s)	4.6	4.7	5.1	5.4									
Degree Utilization, x	0.37	0.34	0.12	0.12									
Capacity (veh/h)	738	727	622	597									
Control Delay (s)	10.3	10.1	8.8	9.1									
Approach Delay (s)	10.3	10.1	8.8	9.1									
Approach LOS	B	B	A	A									
Intersection Summary													
Delay	9.9												
HCM Level of Service	A												
Intersection Capacity Utilization	33.9%		ICU Level of Service				A						
Analysis Period (min)	15												

Queuing and Blocking Report

8/27/2014

Intersection: 5: Park Ave. & N Spring St.

Movement	EB	WB	NB	SB
Directions Served	LT	TR	LTR	LR
Maximum Queue (ft)	77	90	52	52
Average Queue (ft)	47	39	26	21
95th Queue (ft)	80	64	47	48
Link Distance (ft)	113	530	202	303
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 11: Park Ave. & N Oak St.

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	98	147	56	56
Average Queue (ft)	49	58	34	27
95th Queue (ft)	74	97	49	49
Link Distance (ft)	530	228	203	262
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Network Summary

Network wide Queuing Penalty: 0

Appendix E

Descriptions of Level of Service

Level of Service for Signalized Intersections

Level of service for signalized intersections is defined in terms of delay, which is a measure of driver discomfort and frustration, fuel consumption, and lost travel time. Specifically, level-of-service (LOS) criteria are stated in terms of the average stopped delay per vehicle for a 15-min analysis period. The criteria are given in Exhibit 16-2. Delay may be measured in the field or estimated using procedures presented later in this chapter. Delay is a complex measure and is dependent on a number of variables, including the quality of progression, the cycle length, the green ratio, and the V/C ratio for the lane group in question.

LOS A describes operations with very low delay, up to 10 sec per vehicle. This level of service occurs when progression is extremely favorable and most vehicles arrive during the green phase. Most vehicles do not stop at all. Short cycle lengths may also contribute to low delay.

LOS B describes operations with delay greater than 10 and up to 20 sec per vehicle. This level generally occurs with good progression, short cycle lengths, or both. More vehicles stop than with LOS A, causing higher levels of average delay.

Exhibit 16-2. Level-of-Service Criteria for Signalized Intersections

LEVEL OF SERVICE	STOPPED DELAY PER VEHICLE (SEC)
A	≤ 10.0
B	$> 10.0 \text{ and } \leq 20.0$
C	$> 20.0 \text{ and } \leq 35.0$
D	$> 35.0 \text{ and } \leq 55.0$
E	$> 55.0 \text{ and } \leq 80.0$
F	> 80.0

LOS C describes operations with delay greater than 20 and up to 35 sec per vehicle. These higher delays may result from fair progression, longer cycle lengths, or both. Individual cycle failures may begin to appear at this level. The number of vehicles stopping is significant at this level, though many still pass through the intersection without stopping.

LOS D describes operations with delay greater than 35 and up to 55 sec per vehicle. At level D, the influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high V/C ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.

LOS E describes operations with delay greater than 55 and up to 80 sec per vehicle. This level is considered by many agencies to be the limit of acceptable delay. These high delay values generally indicate poor progression, long cycle lengths, and high V/C ratios. Individual cycle failures are frequent occurrences.

LOS F describes operations with delay in excess of 80 sec per vehicle. This level, considered to be unacceptable to most drivers, often occurs with oversaturation, that is, when arrival flow rates exceed the capacity of the intersection. It may also occur at high V/C ratios below 1.0 with many individual cycle failures. Poor progression and long cycle lengths may also be major contributing causes to such delay levels.

Source: [Highway Capacity Manual, 2000](#). Transportation Research Board, National Research Council

Level of Service Criteria for Stop Sign Controlled Intersections

The level of service criteria are given in Table 17-2. As used here, control delay is defined as the total elapsed time from the time a vehicle stops at the end of the queue until the vehicle departs from the stop line; this time includes the time required for the vehicle to travel from the last-in-queue position to the first-in-queue position, including deceleration of vehicles from free-flow speed to the speed of vehicles in queue.

The average total delay for any particular minor movement is a function of the service rate or capacity of the approach and the degree of saturation. . . .

Table 17-2. Level of Service Criteria for TWSC Intersections

LEVEL OF SERVICE	AVERAGE CONTROL DELAY (sec/veh)
A	≤ 10
B	$> 10 \text{ and } \leq 15$
C	$> 15 \text{ and } \leq 25$
D	$> 25 \text{ and } \leq 35$
E	$> 35 \text{ and } \leq 50$
F	> 50

Average total delay less than 10 sec/veh is defined as Level of Service (LOS) A. Follow-up times of less than 5 sec have been measured when there is no conflicting traffic for a minor street movement, so control delays of less than 10 sec/veh are appropriate for low flow conditions. To remain consistent with the AWSC intersection analysis procedure described later in this chapter, a total delay of 50 sec/veh is assumed as the break point between LOS E and F.

The proposed level of service criteria for TWSC intersections are somewhat different from the criteria used in Chapter 16 for signalized intersections. The primary reason for this difference is that drivers expect different levels of performance from different kinds of transportation facilities. The expectation is that a signalized intersection is designed to carry higher traffic volumes than an unsignalized intersection. Additionally, several driver behavior considerations combine to make delays at signalized intersections less onerous than at unsignalized intersections. For example, drivers at signalized intersections are able to relax during the red interval, where drivers on the minor approaches to unsignalized intersections must remain attentive to the task of identifying acceptable gaps and vehicle conflicts. Also, there is often much more variability in the amount of delay experienced by individual drivers at unsignalized than signalized intersections. For these reasons, it is considered that the total delay threshold for any given level of service is less for an unsignalized intersection than for a signalized intersection. . . .

LOS F exists when there are insufficient gaps of suitable size to allow a side street demand to cross safely through a major street traffic stream. This level of service is generally evident from extremely long total delays experienced by side street traffic and by queueing on the minor approaches. The method, however, is based on a constant critical gap size - that is, the critical gap remains constant, no matter how long the side street motorist waits. LOS F may also appear in the form of side street vehicles' selecting smaller-than-usual gaps. In such cases, safety may be a problem and some disruption to the major traffic stream may result. It is important to note that LOS F may not always result in long queues but may result in adjustments to normal gap acceptance behavior. The latter is more difficult to observe on the field than queueing, which is more obvious.

Source: Highway Capacity Manual, 2000. Transportation Research Board, National Research Council

Appendix F

Individual Pipeline Development Trip Assignments

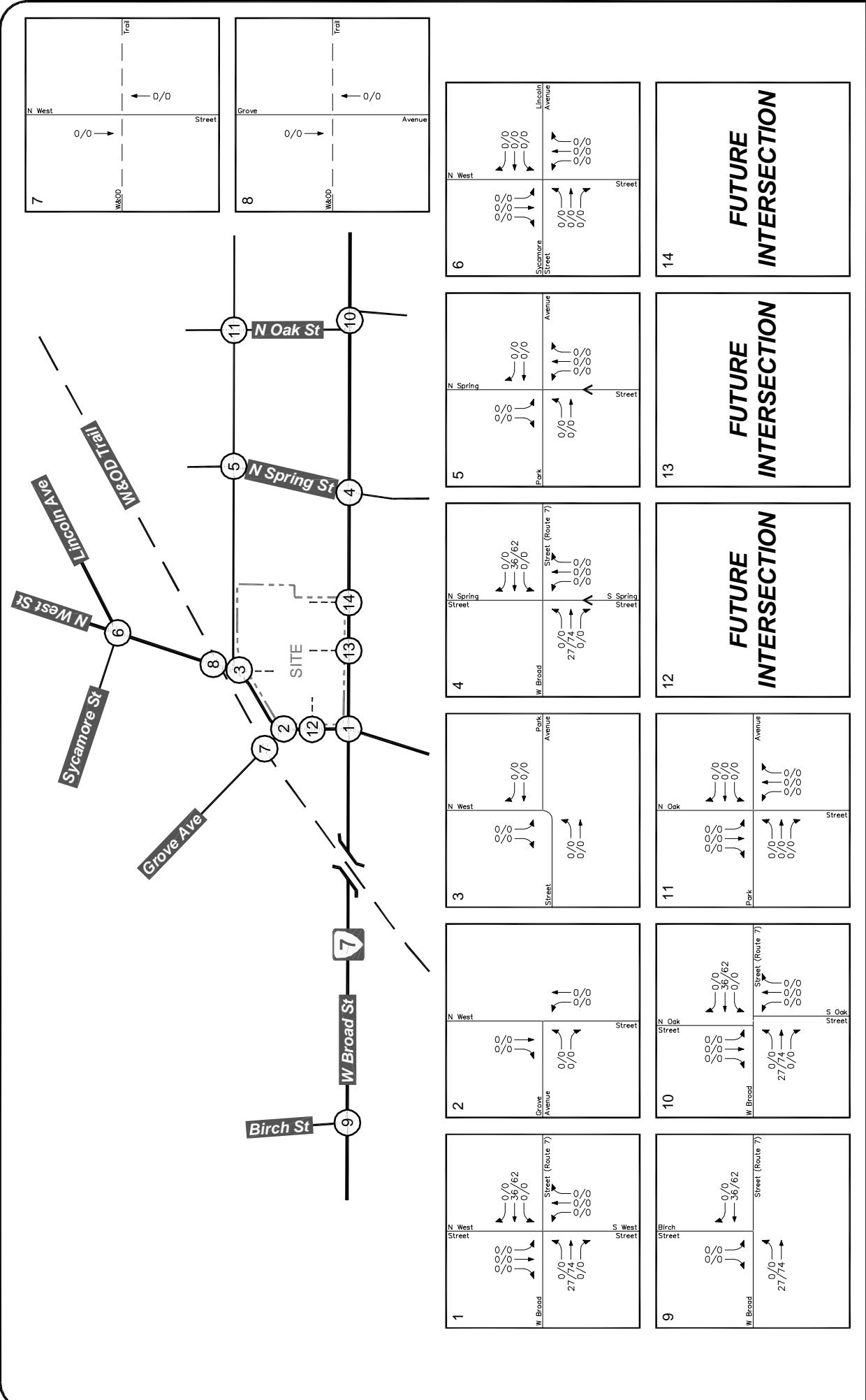


Figure F-1
301 W Broad Street Pipeline Trip Assignments

North
000/000 AM PEAK HOUR
000/000 PM PEAK HOUR

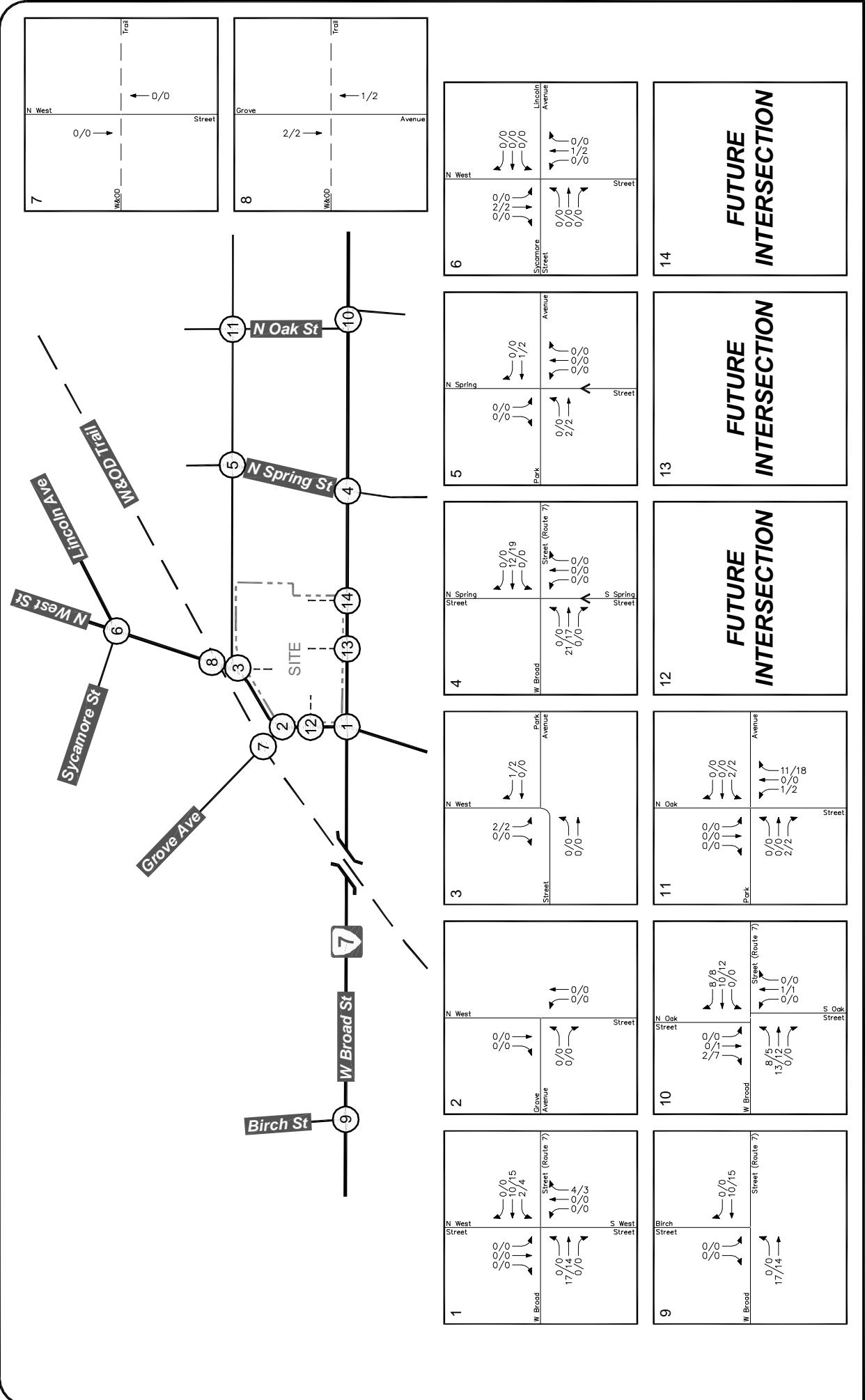


Figure F-2
706 W Broad Street/707 Park Avenue Pipeline Trip Assignments

North
AM PEAK HOUR
000/000

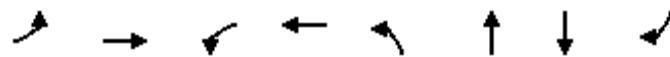
Appendix G

Background Future Conditions Synchro Analysis

Queues

1: Route 7 & N West St.

8/27/2014



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	304	1155	40	1151	257	335	151	157
V/c Ratio	1.48	0.79	0.22	0.87	0.78	0.98	0.56	0.34
Control Delay	260.0	28.9	21.8	46.6	63.9	91.8	54.2	18.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	260.0	28.9	21.8	46.6	63.9	91.8	54.2	18.9
Queue Length 50th (ft)	~281	436	17	503	191	257	104	46
Queue Length 95th (ft)	#456	#589	m28	#626	#318	#449	172	102
Internal Link Dist (ft)		1468			871		431	199
Turn Bay Length (ft)	175		165			250		
Base Capacity (vph)	205	1463	231	1318	328	342	340	467
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.48	0.79	0.17	0.87	0.78	0.98	0.44	0.34

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

1: Route 7 & N West St.

8/27/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑		↑	↑↑		↑	↑		↑	↑	↑
Volume (vph)	280	1006	57	37	1011	48	236	270	39	39	100	144
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11	11	11	11	11	11	11
Total Lost time (s)	4.5	6.0		4.5	6.0		5.0	5.0			5.0	5.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00			1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Fr _t	1.00	0.99		1.00	0.99		1.00	0.98			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.99	1.00
Satd. Flow (prot)	1711	3239		1711	3240		1711	1763			1776	1531
Flt Permitted	0.09	1.00		0.13	1.00		0.95	1.00			0.99	1.00
Satd. Flow (perm)	156	3239		229	3240		1711	1763			1776	1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	304	1093	62	40	1099	52	257	293	42	42	109	157
RTOR Reduction (vph)	0	3	0	0	2	0	0	4	0	0	0	55
Lane Group Flow (vph)	304	1152	0	40	1149	0	257	331	0	0	151	102
Confl. Peds. (#/hr)	8		2	2		8	7		2	2		7
Heavy Vehicles (%)	2%	7%	2%	2%	7%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	4	0	0	0	0	0	0	0	0	0
Turn Type	pm+pt		pm+pt				Split			Split		pt+ov
Protected Phases	5	2		1	6		3	3		4	4	45
Permitted Phases				6								
Actuated Green, G (s)	62.8	53.3		53.8	48.8		23.0	23.0			18.2	32.7
Effective Green, g (s)	62.8	53.3		53.8	48.8		23.0	23.0			18.2	32.7
Actuated g/C Ratio	0.52	0.44		0.45	0.41		0.19	0.19			0.15	0.27
Clearance Time (s)	4.5	6.0		4.5	6.0		5.0	5.0			5.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0			2.0	
Lane Grp Cap (vph)	205	1439		164	1318		328	338			269	417
v/s Ratio Prot	c0.12	0.36		0.01	0.35		0.15	c0.19			c0.09	0.07
v/s Ratio Perm	c0.66			0.10								
v/c Ratio	1.48	0.80		0.24	0.87		0.78	0.98			0.56	0.24
Uniform Delay, d1	31.2	28.8		21.2	32.7		46.1	48.3			47.2	34.0
Progression Factor	0.79	0.82		1.26	1.18		1.00	1.00			1.00	1.00
Incremental Delay, d2	237.4	3.9		0.2	6.7		10.7	42.7			1.6	0.1
Delay (s)	262.0	27.6		26.9	45.3		56.9	90.9			48.8	34.1
Level of Service	F	C		C	D		E	F			D	C
Approach Delay (s)		76.4			44.7			76.1			41.3	
Approach LOS		E			D			E			D	
Intersection Summary												
HCM Average Control Delay		62.7					HCM Level of Service			E		
HCM Volume to Capacity ratio		1.17										
Actuated Cycle Length (s)		120.0					Sum of lost time (s)			14.5		
Intersection Capacity Utilization		89.5%					ICU Level of Service			E		
Analysis Period (min)				15								
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

2: Grove St. & N West St.

8/27/2014



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↑		↑	↑↓	
Volume (veh/h)	0	22	0	548	261	55
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	24	0	596	284	60
Pedestrians				1		
Lane Width (ft)				12.0		
Walking Speed (ft/s)				4.0		
Percent Blockage				0		
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				279	784	
pX, platoon unblocked	0.72					
vC, conflicting volume	909	173	343			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	683	173	343			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	97	100			
cM capacity (veh/h)	277	840	1212			
Direction, Lane #	EB 1	NB 1	SB 1	SB 2		
Volume Total	24	596	189	154		
Volume Left	0	0	0	0		
Volume Right	24	0	0	60		
cSH	840	1700	1700	1700		
Volume to Capacity	0.03	0.35	0.11	0.09		
Queue Length 95th (ft)	2	0	0	0		
Control Delay (s)	9.4	0.0	0.0	0.0		
Lane LOS	A					
Approach Delay (s)	9.4	0.0	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay		0.2				
Intersection Capacity Utilization		39.2%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis

3: Park Ave. & N West St.

8/27/2014

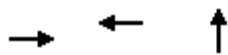


Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	172	34	445	126	29	168
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	187	37	484	137	32	183
Pedestrians	2					
Lane Width (ft)	12.0					
Walking Speed (ft/s)	4.0					
Percent Blockage	0					
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			580			483
pX, platoon unblocked	0.76	0.76				0.76
vC, conflicting volume	800	554				623
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	583	261				351
tC, single (s)	6.4	6.2				4.1
tC, 2 stage (s)						
tF (s)	3.5	3.3				2.2
p0 queue free %	46	94				97
cM capacity (veh/h)	349	593				921
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	224	621	214			
Volume Left	187	0	32			
Volume Right	37	137	0			
cSH	375	1700	921			
Volume to Capacity	0.60	0.37	0.03			
Queue Length 95th (ft)	93	0	3			
Control Delay (s)	27.9	0.0	1.6			
Lane LOS	D		A			
Approach Delay (s)	27.9	0.0	1.6			
Approach LOS	D					
Intersection Summary						
Average Delay			6.2			
Intersection Capacity Utilization		51.8%		ICU Level of Service		A
Analysis Period (min)		15				

Queues

4: Route 7 & N Spring St.

8/27/2014



Lane Group	EBT	WBT	NBT
Lane Group Flow (vph)	1209	1253	111
V/c Ratio	0.61	0.60	0.32
Control Delay	20.9	8.9	19.6
Queue Delay	0.0	0.0	0.0
Total Delay	20.9	8.9	19.6
Queue Length 50th (ft)	485	102	31
Queue Length 95th (ft)	m562	236	61
Internal Link Dist (ft)	871	625	201
Turn Bay Length (ft)			
Base Capacity (vph)	1978	2103	539
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.61	0.60	0.21

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

4: Route 7 & N Spring St.

8/27/2014



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	35	1055	22	14	1094	45	15	68	19	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11	12	15	12	12	12	12
Total Lost time (s)					6.0				6.0			
Lane Util. Factor		0.95				0.95			1.00			
Frpb, ped/bikes		1.00				1.00			1.00			
Flpb, ped/bikes		1.00				1.00			1.00			
Fr _t		1.00				0.99			0.97			
Flt Protected		1.00				1.00			0.99			
Satd. Flow (prot)		3252				3244			1969			
Flt Permitted		0.88				0.93			0.99			
Satd. Flow (perm)		2855				3033			1969			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	38	1147	24	15	1189	49	16	74	21	0	0	0
RTOR Reduction (vph)	0	2	0	0	3	0	0	16	0	0	0	0
Lane Group Flow (vph)	0	1207	0	0	1250	0	0	95	0	0	0	0
Confl. Peds. (#/hr)	10		13	13		10	15		9	9		15
Heavy Vehicles (%)	2%	7%	2%	2%	7%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	4	0	0	4	0	0	0	0	0	0
Turn Type	Perm			Perm			Perm					
Protected Phases		2			2			4				
Permitted Phases	2			2			4					
Actuated Green, G (s)	39.2			39.2			8.8					
Effective Green, g (s)	39.2			39.2			8.8					
Actuated g/C Ratio	0.65			0.65			0.15					
Clearance Time (s)	6.0			6.0			6.0					
Vehicle Extension (s)	1.5			1.5			2.0					
Lane Grp Cap (vph)	1865			1982			289					
v/s Ratio Prot												
v/s Ratio Perm	c0.42			0.41			0.05					
v/c Ratio	0.65			0.63			0.33					
Uniform Delay, d1	6.2			6.1			22.9					
Progression Factor	2.73			1.00			1.00					
Incremental Delay, d2	1.1			1.5			0.2					
Delay (s)	18.1			7.7			23.2					
Level of Service	B			A			C					
Approach Delay (s)	18.1			7.7			23.2			0.0		
Approach LOS	B			A			C			A		
Intersection Summary												
HCM Average Control Delay	13.3			HCM Level of Service			B					
HCM Volume to Capacity ratio	0.59											
Actuated Cycle Length (s)	60.0			Sum of lost time (s)			12.0					
Intersection Capacity Utilization	77.8%			ICU Level of Service			D					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

5: Park Ave. & N Spring St.

8/27/2014



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	14	130	0	0	192	30	19	43	95	20	0	18
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	15	141	0	0	209	33	21	47	103	22	0	20
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	157	241	171	41								
Volume Left (vph)	15	0	21	22								
Volume Right (vph)	0	33	103	20								
Hadj (s)	0.05	-0.05	-0.30	-0.14								
Departure Headway (s)	4.8	4.6	4.6	4.9								
Degree Utilization, x	0.21	0.31	0.22	0.06								
Capacity (veh/h)	706	747	724	651								
Control Delay (s)	9.0	9.6	8.9	8.2								
Approach Delay (s)	9.0	9.6	8.9	8.2								
Approach LOS	A	A	A	A								
Intersection Summary												
Delay					9.1							
HCM Level of Service					A							
Intersection Capacity Utilization				35.3%		ICU Level of Service					A	
Analysis Period (min)					15							

Queues

6: Lincoln Ave. & N West St.

8/27/2014



Lane Group	EBT	WBT	NBT	NBR	SBT
Lane Group Flow (vph)	31	63	317	205	171
V/c Ratio	0.24	0.40	0.23	0.17	0.13
Control Delay	39.2	45.6	6.8	1.5	6.4
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	39.2	45.6	6.8	1.5	6.4
Queue Length 50th (ft)	14	34	73	0	36
Queue Length 95th (ft)	42	73	134	26	73
Internal Link Dist (ft)	413	1025	252		266
Turn Bay Length (ft)				150	
Base Capacity (vph)	328	480	1389	1176	1345
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.09	0.13	0.23	0.17	0.13

Intersection Summary

HCM Signalized Intersection Capacity Analysis

6: Lincoln Ave. & N West St.

8/27/2014



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	21	7	47	4	7	1	291	189	12	144	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0			6.0			6.0	6.0		6.0	
Lane Util. Factor		1.00			1.00			1.00	1.00		1.00	
Frpb, ped/bikes		0.98			1.00			1.00	0.97		1.00	
Flpb, ped/bikes		1.00			1.00			1.00	1.00		1.00	
Fr _t		0.97			0.98			1.00	0.85		1.00	
Flt Protected		1.00			0.96			1.00	1.00		1.00	
Satd. Flow (prot)		1769			1760			1862	1528		1853	
Flt Permitted		1.00			0.96			1.00	1.00		0.97	
Satd. Flow (perm)		1769			1760			1862	1528		1805	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	23	8	51	4	8	1	316	205	13	157	1
RTOR Reduction (vph)	0	8	0	0	6	0	0	0	62	0	0	0
Lane Group Flow (vph)	0	23	0	0	57	0	0	317	143	0	171	0
Confl. Peds. (#/hr)			4	4			12		21	21		12
Turn Type	Split			Split			Perm		Perm	Perm		
Protected Phases	1	1		3	3			2			2	
Permitted Phases							2		2	2		
Actuated Green, G (s)		4.7			7.6			69.7	69.7		69.7	
Effective Green, g (s)		4.7			7.6			69.7	69.7		69.7	
Actuated g/C Ratio		0.05			0.08			0.70	0.70		0.70	
Clearance Time (s)		6.0			6.0			6.0	6.0		6.0	
Vehicle Extension (s)		3.0			3.0			3.0	3.0		3.0	
Lane Grp Cap (vph)		83			134			1298	1065		1258	
v/s Ratio Prot	c0.01			c0.03								
v/s Ratio Perm								0.17	0.09		0.09	
v/c Ratio		0.28			0.42			0.24	0.13		0.14	
Uniform Delay, d1		46.0			44.1			5.5	5.1		5.1	
Progression Factor		1.00			1.00			1.00	1.00		1.00	
Incremental Delay, d2		1.9			2.1			0.4	0.3		0.2	
Delay (s)		47.9			46.2			6.0	5.3		5.3	
Level of Service		D			D			A	A		A	
Approach Delay (s)		47.9			46.2			5.7			5.3	
Approach LOS		D			D			A			A	
Intersection Summary												
HCM Average Control Delay		10.5			HCM Level of Service			B				
HCM Volume to Capacity ratio		0.26										
Actuated Cycle Length (s)		100.0			Sum of lost time (s)			18.0				
Intersection Capacity Utilization		46.6%			ICU Level of Service			A				
Analysis Period (min)		15										

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

7: W&OD Trail & Grove St.

8/27/2014



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	0	0	0	0	55	0	0	22	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	0	0	0	0	60	0	0	24	0
Pedestrians								25			31	
Lane Width (ft)								12.0			12.0	
Walking Speed (ft/s)								4.0			4.0	
Percent Blockage								2			3	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	115	84	49	109	84	91	24			60		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	115	84	49	109	84	91	24			60		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	100	100	100	100			100		
cM capacity (veh/h)	840	806	998	852	806	942	1591			1544		
Direction, Lane #	NB 1	SB 1										
Volume Total	60	24										
Volume Left	0	0										
Volume Right	0	0										
cSH	1700	1700										
Volume to Capacity	0.04	0.01										
Queue Length 95th (ft)	0	0										
Control Delay (s)	0.0	0.0										
Lane LOS												
Approach Delay (s)	0.0	0.0										
Approach LOS												
Intersection Summary												
Average Delay		0.0										
Intersection Capacity Utilization		6.7%		ICU Level of Service					A			
Analysis Period (min)		15										

HCM Unsignalized Intersection Capacity Analysis

8: W&OD Trail & N West St.

8/27/2014



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	0	0	0	0	453	0	0	187	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	0	0	0	0	492	0	0	203	0
Pedestrians								27			32	
Lane Width (ft)								12.0			12.0	
Walking Speed (ft/s)								4.0			4.0	
Percent Blockage								2			3	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								731			332	
pX, platoon unblocked												
vC, conflicting volume	728	696	230	723	696	524	203				492	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	728	696	230	723	696	524	203				492	
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1				4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2				2.2	
p0 queue free %	100	100	100	100	100	100	100				100	
cM capacity (veh/h)	330	365	791	334	365	538	1368				1071	
Direction, Lane #	NB 1	SB 1										
Volume Total	492	203										
Volume Left	0	0										
Volume Right	0	0										
cSH	1700	1700										
Volume to Capacity	0.29	0.12										
Queue Length 95th (ft)	0	0										
Control Delay (s)	0.0	0.0										
Lane LOS												
Approach Delay (s)	0.0	0.0										
Approach LOS												
Intersection Summary												
Average Delay		0.0										
Intersection Capacity Utilization		27.2%		ICU Level of Service				A				
Analysis Period (min)		15										

Queues

9: Route 7 & Birch St.

8/27/2014



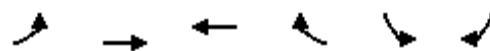
Lane Group	EBL	EBT	WBT	SBL
Lane Group Flow (vph)	82	1542	1509	105
v/c Ratio	0.34	0.60	0.65	0.45
Control Delay	8.1	7.8	9.5	42.2
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	8.1	7.8	9.5	42.2
Queue Length 50th (ft)	16	282	510	56
Queue Length 95th (ft)	30	343	601	111
Internal Link Dist (ft)		310	1468	305
Turn Bay Length (ft)	300			
Base Capacity (vph)	279	2586	2317	328
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.29	0.60	0.65	0.32

Intersection Summary

HCM Signalized Intersection Capacity Analysis

9: Route 7 & Birch St.

8/27/2014



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	75	1419	1321	67	61	36
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		6.0	
Lane Util. Factor	1.00	0.95	0.95		1.00	
Frpb, ped/bikes	1.00	1.00	1.00		0.98	
Flpb, ped/bikes	1.00	1.00	1.00		1.00	
Fr _t	1.00	1.00	0.99		0.95	
Fl _t Protected	0.95	1.00	1.00		0.97	
Satd. Flow (prot)	1770	3347	3352		1689	
Fl _t Permitted	0.11	1.00	1.00		0.97	
Satd. Flow (perm)	210	3347	3352		1689	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	82	1542	1436	73	66	39
RTOR Reduction (vph)	0	0	2	0	19	0
Lane Group Flow (vph)	82	1542	1507	0	86	0
Confl. Peds. (#/hr)	4			4	3	18
Heavy Vehicles (%)	2%	7%	7%	2%	2%	2%
Bus Blockages (#/hr)	0	4	0	0	0	0
Turn Type	pm+pt					
Protected Phases	5	2	6		4	
Permitted Phases	2					
Actuated Green, G (s)	92.7	92.7	81.7		15.3	
Effective Green, g (s)	92.7	92.7	81.7		15.3	
Actuated g/C Ratio	0.77	0.77	0.68		0.13	
Clearance Time (s)	6.0	6.0	6.0		6.0	
Vehicle Extension (s)	2.0	2.0	2.0		2.0	
Lane Grp Cap (vph)	227	2586	2282		215	
v/s Ratio Prot	0.02	c0.46	c0.45		c0.05	
v/s Ratio Perm	0.26					
v/c Ratio	0.36	0.60	0.66		0.40	
Uniform Delay, d1	8.4	5.8	11.1		48.1	
Progression Factor	1.00	1.00	0.68		1.00	
Incremental Delay, d2	0.4	1.0	0.9		0.4	
Delay (s)	8.7	6.8	8.5		48.6	
Level of Service	A	A	A		D	
Approach Delay (s)		6.9	8.5		48.6	
Approach LOS		A	A		D	
Intersection Summary						
HCM Average Control Delay		9.0		HCM Level of Service		A
HCM Volume to Capacity ratio		0.64				
Actuated Cycle Length (s)		120.0		Sum of lost time (s)		18.0
Intersection Capacity Utilization		69.2%		ICU Level of Service		C
Analysis Period (min)		15				
c Critical Lane Group						

HCM Unsignalized Intersection Capacity Analysis

10: Route 7 & N Oak St.

8/27/2014

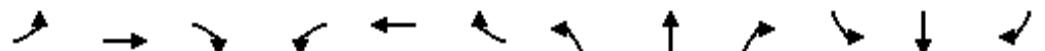


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	46	1129	11	15	1166	71	29	15	19	4	3	78
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	50	1227	12	16	1267	77	32	16	21	4	3	85
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)		705										
pX, platoon unblocked				0.83			0.83	0.83	0.83	0.83	0.83	
vC, conflicting volume	1345			1239			2086	2710	620	2081	2678	672
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1345			879			1899	2651	133	1893	2612	672
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	90			97			0	1	97	0	81	79
cM capacity (veh/h)	508			635			21	17	740	2	18	398
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1						
Volume Total	664	626	650	711	68	92						
Volume Left	50	0	16	0	32	4						
Volume Right	0	12	0	77	21	85						
cSH	508	1700	635	1700	28	40						
Volume to Capacity	0.10	0.37	0.03	0.42	2.48	2.29						
Queue Length 95th (ft)	8	0	2	0	206	249						
Control Delay (s)	2.8	0.0	0.7	0.0	976.3	804.7						
Lane LOS	A		A		F	F						
Approach Delay (s)	1.4		0.3		976.3	804.7						
Approach LOS					F	F						
Intersection Summary												
Average Delay			51.1									
Intersection Capacity Utilization		82.2%			ICU Level of Service				E			
Analysis Period (min)		15										

HCM Unsignalized Intersection Capacity Analysis

11: Park Ave. & N Oak St.

8/27/2014



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Sign Control		Stop			Stop			Stop			Stop		
Volume (vph)	32	187	51	15	132	11	47	48	45	17	13	68	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Hourly flow rate (vph)	35	203	55	16	143	12	51	52	49	18	14	74	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1									
Volume Total (vph)	293	172	152	107									
Volume Left (vph)	35	16	51	18									
Volume Right (vph)	55	12	49	74									
Hadj (s)	-0.06	0.01	-0.09	-0.35									
Departure Headway (s)	4.8	5.0	5.1	4.9									
Degree Utilization, x	0.39	0.24	0.22	0.15									
Capacity (veh/h)	714	672	640	648									
Control Delay (s)	10.7	9.5	9.5	8.8									
Approach Delay (s)	10.7	9.5	9.5	8.8									
Approach LOS	B	A	A	A									
Intersection Summary													
Delay	9.9												
HCM Level of Service	A												
Intersection Capacity Utilization	41.6%		ICU Level of Service				A						
Analysis Period (min)	15												

Queuing and Blocking Report

8/26/2014

Intersection: 5: Park Ave. & N Spring St.

Movement	EB	WB	NB	SB
Directions Served	LT	TR	LTR	LR
Maximum Queue (ft)	128	91	67	55
Average Queue (ft)	49	43	43	26
95th Queue (ft)	90	69	63	48
Link Distance (ft)	113	530	202	303
Upstream Blk Time (%)	0			
Queuing Penalty (veh)	0			
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 11: Park Ave. & N Oak St.

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	124	101	75	67
Average Queue (ft)	53	43	40	34
95th Queue (ft)	85	69	63	57
Link Distance (ft)	530	228	203	262
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

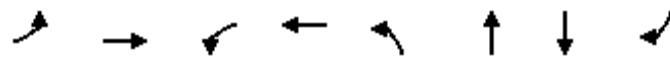
Network Summary

Network wide Queuing Penalty: 0

Queues

1: Route 7 & N West St.

8/27/2014



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	312	1334	99	1060	198	233	503	254
V/c Ratio	1.29	0.94	0.60	0.78	0.73	0.83	1.53	0.59
Control Delay	184.1	40.3	41.0	37.2	68.0	72.7	289.1	19.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	184.1	40.3	41.0	37.2	68.0	72.7	289.1	19.6
Queue Length 50th (ft)	~262	580	53	307	157	177	~592	47
Queue Length 95th (ft)	#465	#768	114	406	241	#271	#809	139
Internal Link Dist (ft)		1468		871		431	199	
Turn Bay Length (ft)	175		165		250			
Base Capacity (vph)	242	1421	195	1360	316	328	329	433
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.29	0.94	0.51	0.78	0.63	0.71	1.53	0.59

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

1: Route 7 & N West St.

8/27/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑		↑	↑↑		↑	↑		↑	↑	↑
Volume (vph)	287	1148	79	91	969	6	182	153	62	81	382	234
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11	11	11	11	11	11	11
Total Lost time (s)	4.5	6.0		4.5	6.0		5.0	5.0			5.0	5.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00			1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00			1.00	0.99
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Fr _t	1.00	0.99		1.00	1.00		1.00	0.96			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.99	1.00
Satd. Flow (prot)	1711	3240		1711	3259		1711	1715			1785	1510
Flt Permitted	0.12	1.00		0.07	1.00		0.95	1.00			0.99	1.00
Satd. Flow (perm)	223	3240		133	3259		1711	1715			1785	1510
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	312	1248	86	99	1053	7	198	166	67	88	415	254
RTOR Reduction (vph)	0	3	0	0	1	0	0	12	0	0	0	154
Lane Group Flow (vph)	312	1331	0	99	1059	0	198	221	0	0	503	100
Confl. Peds. (#/hr)							1		2	2		1
Heavy Vehicles (%)	2%	7%	2%	2%	7%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	4	0	0	0	0	0	0	0	0	0
Turn Type	pm+pt			pm+pt			Split			Split		Perm
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases	2			6								4
Actuated Green, G (s)	67.7	56.9		62.3	54.2		20.5	20.5			24.0	24.0
Effective Green, g (s)	67.7	56.9		62.3	54.2		20.5	20.5			24.0	24.0
Actuated g/C Ratio	0.52	0.44		0.48	0.42		0.16	0.16			0.18	0.18
Clearance Time (s)	4.5	6.0		4.5	6.0		5.0	5.0			5.0	5.0
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0			2.0	2.0
Lane Grp Cap (vph)	240	1418		162	1359		270	270			330	279
v/s Ratio Prot	c0.11	0.41		0.04	0.33		0.12	c0.13			c0.28	
v/s Ratio Perm	c0.57			0.25								0.07
v/c Ratio	1.30	0.94		0.61	0.78		0.73	0.82			1.52	0.36
Uniform Delay, d1	26.7	34.9		25.9	32.7		52.1	53.0			53.0	46.3
Progression Factor	1.77	0.81		1.37	0.99		1.00	1.00			1.00	1.00
Incremental Delay, d2	156.5	10.7		3.9	3.7		8.6	16.5			250.8	0.3
Delay (s)	203.9	38.8		39.4	36.1		60.7	69.5			303.8	46.6
Level of Service	F	D		D	D		E	E			F	D
Approach Delay (s)	70.1			36.4			65.5				217.5	
Approach LOS	E			D			E				F	
Intersection Summary												
HCM Average Control Delay	87.8						HCM Level of Service			F		
HCM Volume to Capacity ratio	1.27											
Actuated Cycle Length (s)	130.0						Sum of lost time (s)			19.0		
Intersection Capacity Utilization	96.9%						ICU Level of Service			F		
Analysis Period (min)	15											
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

2: Grove St. & N West St.

8/27/2014



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↑ ↗		↑ ↘	↑ ↖	
Volume (veh/h)	0	70	0	432	605	51
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	76	0	470	658	55
Pedestrians					3	
Lane Width (ft)					12.0	
Walking Speed (ft/s)					4.0	
Percent Blockage					0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				279	784	
pX, platoon unblocked	0.79					
vC, conflicting volume	1158	357	713			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1065	357	713			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	88	100			
cM capacity (veh/h)	171	640	883			
Direction, Lane #	EB 1	NB 1	SB 1	SB 2		
Volume Total	76	470	438	275		
Volume Left	0	0	0	0		
Volume Right	76	0	0	55		
cSH	640	1700	1700	1700		
Volume to Capacity	0.12	0.28	0.26	0.16		
Queue Length 95th (ft)	10	0	0	0		
Control Delay (s)	11.4	0.0	0.0	0.0		
Lane LOS	B					
Approach Delay (s)	11.4	0.0	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay		0.7				
Intersection Capacity Utilization		29.3%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis

3: Park Ave. & N West St.

8/27/2014

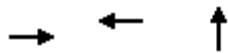


Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	159	31	327	121	43	503
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	173	34	355	132	47	547
Pedestrians	3					
Lane Width (ft)	12.0					
Walking Speed (ft/s)	4.0					
Percent Blockage	0					
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			580			483
pX, platoon unblocked	0.90	0.84				0.84
vC, conflicting volume	1064	424				490
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	617	219				297
tC, single (s)	6.4	6.2				4.1
tC, 2 stage (s)						
tF (s)	3.5	3.3				2.2
p0 queue free %	56	95				96
cM capacity (veh/h)	390	688				1059
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	207	487	593			
Volume Left	173	0	47			
Volume Right	34	132	0			
cSH	419	1700	1059			
Volume to Capacity	0.49	0.29	0.04			
Queue Length 95th (ft)	66	0	3			
Control Delay (s)	21.6	0.0	1.2			
Lane LOS	C		A			
Approach Delay (s)	21.6	0.0	1.2			
Approach LOS	C					
Intersection Summary						
Average Delay			4.0			
Intersection Capacity Utilization		74.2%		ICU Level of Service		D
Analysis Period (min)		15				

Queues

4: Route 7 & N Spring St.

8/27/2014



Lane Group	EBT	WBT	NBT
Lane Group Flow (vph)	1477	1347	44
v/c Ratio	0.60	0.59	0.23
Control Delay	4.5	5.7	33.4
Queue Delay	0.0	0.0	0.0
Total Delay	4.5	5.7	33.4
Queue Length 50th (ft)	41	206	16
Queue Length 95th (ft)	m93	259	53
Internal Link Dist (ft)	871	625	201
Turn Bay Length (ft)			
Base Capacity (vph)	2455	2273	404
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.60	0.59	0.11

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

4: Route 7 & N Spring St.

8/27/2014

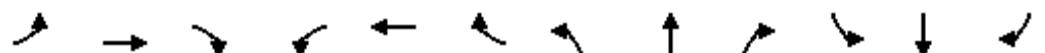


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	26	1322	11	37	1165	38	10	9	21	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11	12	15	12	12	12	12
Total Lost time (s)					6.0				6.0			
Lane Util. Factor		0.95				0.95			1.00			
Frpb, ped/bikes		1.00				1.00			0.99			
Flpb, ped/bikes		1.00				1.00			1.00			
Fr _t		1.00				1.00			0.93			
Flt Protected		1.00				1.00			0.99			
Satd. Flow (prot)		3257				3248			1859			
Flt Permitted		0.89				0.83			0.99			
Satd. Flow (perm)		2900				2688			1859			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	28	1437	12	40	1266	41	11	10	23	0	0	0
RTOR Reduction (vph)	0	0	0	0	1	0	0	21	0	0	0	0
Lane Group Flow (vph)	0	1477	0	0	1346	0	0	23	0	0	0	0
Confl. Peds. (#/hr)	1	6	6			1	2		3	3		2
Heavy Vehicles (%)	2%	7%	2%	2%	7%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	4	0	0	4	0	0	0	0	0	0
Turn Type	Perm			Perm			Perm					
Protected Phases		2			2			4				
Permitted Phases	2			2			4					
Actuated Green, G (s)	107.6			107.6			10.4					
Effective Green, g (s)	107.6			107.6			10.4					
Actuated g/C Ratio	0.83			0.83			0.08					
Clearance Time (s)	6.0			6.0			6.0					
Vehicle Extension (s)	1.5			1.5			2.0					
Lane Grp Cap (vph)	2400			2225			149					
v/s Ratio Prot												
v/s Ratio Perm	c0.51			0.50			0.01					
v/c Ratio	0.62			0.60			0.15					
Uniform Delay, d1	3.9			3.9			55.7					
Progression Factor	0.90			1.00			1.00					
Incremental Delay, d2	0.5			1.2			0.2					
Delay (s)	4.0			5.1			55.9					
Level of Service	A			A			E					
Approach Delay (s)	4.0			5.1			55.9		0.0			
Approach LOS	A			A			E			A		
Intersection Summary												
HCM Average Control Delay	5.3			HCM Level of Service			A					
HCM Volume to Capacity ratio	0.57											
Actuated Cycle Length (s)	130.0			Sum of lost time (s)			12.0					
Intersection Capacity Utilization	79.8%			ICU Level of Service			D					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

5: Park Ave. & N Spring St.

8/27/2014



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Sign Control		Stop			Stop			Stop			Stop		
Volume (vph)	18	164	0	0	180	9	13	18	36	20	0	18	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Hourly flow rate (vph)	20	178	0	0	196	10	14	20	39	22	0	20	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1									
Volume Total (vph)	198	205	73	41									
Volume Left (vph)	20	0	14	22									
Volume Right (vph)	0	10	39	20									
Hadj (s)	0.05	0.01	-0.25	-0.14									
Departure Headway (s)	4.5	4.4	4.6	4.8									
Degree Utilization, x	0.25	0.25	0.09	0.05									
Capacity (veh/h)	780	783	710	680									
Control Delay (s)	8.9	8.9	8.1	8.1									
Approach Delay (s)	8.9	8.9	8.1	8.1									
Approach LOS	A	A	A	A									
Intersection Summary													
Delay	8.7												
HCM Level of Service	A												
Intersection Capacity Utilization	35.9%		ICU Level of Service				A						
Analysis Period (min)	15												

Queues

6: Lincoln Ave. & N West St.

8/27/2014



Lane Group	EBT	WBT	NBT	NBR	SBT
Lane Group Flow (vph)	48	204	269	123	423
V/c Ratio	0.15	0.38	0.41	0.20	0.66
Control Delay	30.0	29.5	26.8	5.0	33.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	30.0	29.5	26.8	5.0	33.0
Queue Length 50th (ft)	20	101	128	0	224
Queue Length 95th (ft)	52	165	200	37	332
Internal Link Dist (ft)	413	1025	252		266
Turn Bay Length (ft)				150	
Base Capacity (vph)	322	542	650	626	644
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.15	0.38	0.41	0.20	0.66

Intersection Summary

HCM Signalized Intersection Capacity Analysis

6: Lincoln Ave. & N West St.

8/27/2014



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	34	10	170	11	6	8	239	113	20	368	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5			5.5			5.5	5.5		5.5	
Lane Util. Factor		1.00			1.00			1.00	1.00		1.00	
Frpb, ped/bikes		0.99			1.00			1.00	0.97		1.00	
Flpb, ped/bikes		1.00			1.00			1.00	1.00		1.00	
Fr _t		0.97			1.00			1.00	0.85		1.00	
Flt Protected		1.00			0.96			1.00	1.00		1.00	
Satd. Flow (prot)		1788			1774			1860	1539		1857	
Flt Permitted		1.00			0.96			0.98	1.00		0.97	
Satd. Flow (perm)		1788			1774			1832	1539		1814	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	37	11	185	12	7	9	260	123	22	400	1
RTOR Reduction (vph)	0	9	0	0	1	0	0	0	79	0	0	0
Lane Group Flow (vph)	0	39	0	0	203	0	0	269	44	0	423	0
Confl. Peds. (#/hr)			8	8					6	6		
Turn Type	Split			Split			Perm		Perm	Perm		
Protected Phases	1	1		3	3			2			2	
Permitted Phases							2		2	2		
Actuated Green, G (s)	17.5			30.5			35.5	35.5		35.5		
Effective Green, g (s)	17.5			30.5			35.5	35.5		35.5		
Actuated g/C Ratio	0.18			0.30			0.36	0.36		0.36		
Clearance Time (s)	5.5			5.5			5.5	5.5		5.5		
Lane Grp Cap (vph)	313			541			650	546		644		
v/s Ratio Prot	c0.02			c0.11								
v/s Ratio Perm							0.15	0.03		c0.23		
v/c Ratio	0.12			0.37			0.41	0.08		0.66		
Uniform Delay, d1	34.8			27.3			24.4	21.4		27.1		
Progression Factor	1.00			1.00			1.00	1.00		1.00		
Incremental Delay, d2	0.8			2.0			1.9	0.3		5.2		
Delay (s)	35.6			29.2			26.3	21.7		32.3		
Level of Service	D			C			C	C		C		
Approach Delay (s)	35.6			29.2			24.9			32.3		
Approach LOS	D			C			C			C		
Intersection Summary												
HCM Average Control Delay	29.1			HCM Level of Service			C					
HCM Volume to Capacity ratio	0.44											
Actuated Cycle Length (s)	100.0			Sum of lost time (s)			16.5					
Intersection Capacity Utilization	61.9%			ICU Level of Service			B					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

7: W&OD Trail & Grove St.

8/27/2014



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	0	0	0	0	51	0	0	70	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	0	0	0	0	55	0	0	76	0
Pedestrians								2			5	
Lane Width (ft)								12.0			12.0	
Walking Speed (ft/s)								4.0			4.0	
Percent Blockage								0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	137	132	78	134	132	60	76				55	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	137	132	78	134	132	60	76				55	
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1				4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2				2.2	
p0 queue free %	100	100	100	100	100	100	100				100	
cM capacity (veh/h)	831	759	981	837	759	1001	1523				1549	
Direction, Lane #	NB 1	SB 1										
Volume Total	55	76										
Volume Left	0	0										
Volume Right	0	0										
cSH	1700	1700										
Volume to Capacity	0.03	0.04										
Queue Length 95th (ft)	0	0										
Control Delay (s)	0.0	0.0										
Lane LOS												
Approach Delay (s)	0.0	0.0										
Approach LOS												
Intersection Summary												
Average Delay		0.0										
Intersection Capacity Utilization		7.0%		ICU Level of Service					A			
Analysis Period (min)		15										

HCM Unsignalized Intersection Capacity Analysis

8: W&OD Trail & N West St.

8/27/2014



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	0	0	0	0	339	0	0	517	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	0	0	0	0	368	0	0	562	0
Pedestrians								3			3	
Lane Width (ft)								12.0			12.0	
Walking Speed (ft/s)								4.0			4.0	
Percent Blockage								0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								731			332	
pX, platoon unblocked	0.82	0.82	0.82	0.82	0.82	0.99	0.82				0.99	
vC, conflicting volume	933	930	565	933	930	371	562				368	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	794	790	356	794	790	365	353				362	
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1				4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2				2.2	
p0 queue free %	100	100	100	100	100	100	100				100	
cM capacity (veh/h)	250	264	561	250	264	674	986				1190	
Direction, Lane #	NB 1	SB 1										
Volume Total	368	562										
Volume Left	0	0										
Volume Right	0	0										
cSH	1700	1700										
Volume to Capacity	0.22	0.33										
Queue Length 95th (ft)	0	0										
Control Delay (s)	0.0	0.0										
Lane LOS												
Approach Delay (s)	0.0	0.0										
Approach LOS												
Intersection Summary												
Average Delay		0.0										
Intersection Capacity Utilization		30.5%		ICU Level of Service				A				
Analysis Period (min)		15										

Queues

9: Route 7 & Birch St.

8/27/2014



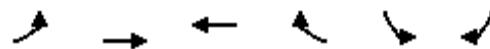
Lane Group	EBL	EBT	WBT	SBL
Lane Group Flow (vph)	103	1664	1368	193
v/c Ratio	0.38	0.65	0.61	0.75
Control Delay	8.5	9.3	25.6	64.4
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	8.5	9.3	25.6	64.4
Queue Length 50th (ft)	21	326	488	138
Queue Length 95th (ft)	41	448	596	214
Internal Link Dist (ft)		310	1468	305
Turn Bay Length (ft)	300			
Base Capacity (vph)	358	2563	2240	408
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.29	0.65	0.61	0.47

Intersection Summary

HCM Signalized Intersection Capacity Analysis

9: Route 7 & Birch St.

8/27/2014



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	95	1531	1185	74	111	66
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		6.0	
Lane Util. Factor	1.00	0.95	0.95		1.00	
Frpb, ped/bikes	1.00	1.00	1.00		0.99	
Flpb, ped/bikes	1.00	1.00	1.00		1.00	
Fr _t	1.00	1.00	0.99		0.95	
Fl _t Protected	0.95	1.00	1.00		0.97	
Satd. Flow (prot)	1770	3347	3347		1697	
Fl _t Permitted	0.14	1.00	1.00		0.97	
Satd. Flow (perm)	255	3347	3347		1697	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	103	1664	1288	80	121	72
RTOR Reduction (vph)	0	0	2	0	18	0
Lane Group Flow (vph)	103	1664	1366	0	175	0
Confl. Peds. (#/hr)	4			4		9
Heavy Vehicles (%)	2%	7%	7%	2%	2%	2%
Bus Blockages (#/hr)	0	4	0	0	0	0
Turn Type	pm+pt					
Protected Phases	5	2	6		4	
Permitted Phases	2					
Actuated Green, G (s)	99.6	99.6	87.0		18.4	
Effective Green, g (s)	99.6	99.6	87.0		18.4	
Actuated g/C Ratio	0.77	0.77	0.67		0.14	
Clearance Time (s)	6.0	6.0	6.0		6.0	
Vehicle Extension (s)	2.0	2.0	2.0		2.0	
Lane Grp Cap (vph)	272	2564	2240		240	
v/s Ratio Prot	0.02	c0.50	0.41		c0.10	
v/s Ratio Perm	0.27					
v/c Ratio	0.38	0.65	0.61		0.73	
Uniform Delay, d1	8.2	7.1	12.0		53.4	
Progression Factor	1.00	1.00	1.87		1.00	
Incremental Delay, d2	0.3	1.3	0.8		9.0	
Delay (s)	8.5	8.4	23.4		62.4	
Level of Service	A	A	C		E	
Approach Delay (s)		8.4	23.4		62.4	
Approach LOS		A	C		E	
Intersection Summary						
HCM Average Control Delay		17.7	HCM Level of Service		B	
HCM Volume to Capacity ratio		0.66				
Actuated Cycle Length (s)		130.0	Sum of lost time (s)		12.0	
Intersection Capacity Utilization		67.7%	ICU Level of Service		C	
Analysis Period (min)		15				
c Critical Lane Group						

HCM Unsignalized Intersection Capacity Analysis

10: Route 7 & N Oak St.

8/27/2014



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	31	1418	31	28	1281	43	10	7	35	10	6	78
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	34	1541	34	30	1392	47	11	8	38	11	7	85
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)		705										
pX, platoon unblocked				0.85			0.85	0.85	0.85	0.85	0.85	
vC, conflicting volume	1439			1575			2471	3126	788	2357	3119	720
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1439			1332			2380	3147	410	2247	3139	720
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	93			93			0	3	92	0	18	77
cM capacity (veh/h)	467			439			3	8	505	2	8	371
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1						
Volume Total	804	804	727	743	57	102						
Volume Left	34	0	30	0	11	11						
Volume Right	0	34	0	47	38	85						
cSH	467	1700	439	1700	13	16						
Volume to Capacity	0.07	0.47	0.07	0.44	4.20	6.46						
Queue Length 95th (ft)	6	0	6	0	Err	Err						
Control Delay (s)	2.2	0.0	2.1	0.0	Err	Err						
Lane LOS	A		A		F	F						
Approach Delay (s)	1.1		1.1		Err	Err						
Approach LOS					F	F						
Intersection Summary												
Average Delay			491.2									
Intersection Capacity Utilization		75.7%		ICU Level of Service			D					
Analysis Period (min)		15										

HCM Unsignalized Intersection Capacity Analysis

11: Park Ave. & N Oak St.

8/27/2014



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	17	188	39	19	188	14	11	27	56	35	24	11
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	18	204	42	21	204	15	12	29	61	38	26	12
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	265	240	102	76								
Volume Left (vph)	18	21	12	38								
Volume Right (vph)	42	15	61	12								
Hadj (s)	-0.05	0.01	-0.30	0.04								
Departure Headway (s)	4.6	4.7	4.9	5.3								
Degree Utilization, x	0.34	0.31	0.14	0.11								
Capacity (veh/h)	737	726	656	606								
Control Delay (s)	10.0	9.8	8.7	9.0								
Approach Delay (s)	10.0	9.8	8.7	9.0								
Approach LOS	A	A	A	A								
Intersection Summary												
Delay					9.6							
HCM Level of Service					A							
Intersection Capacity Utilization				33.7%		ICU Level of Service					A	
Analysis Period (min)					15							

Queuing and Blocking Report

8/26/2014

Intersection: 5: Park Ave. & N Spring St.

Movement	EB	WB	NB	SB
Directions Served	LT	TR	LTR	LR
Maximum Queue (ft)	77	78	28	52
Average Queue (ft)	45	37	25	24
95th Queue (ft)	75	57	38	48
Link Distance (ft)	113	530	202	303
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 11: Park Ave. & N Oak St.

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	75	103	101	55
Average Queue (ft)	43	52	39	27
95th Queue (ft)	65	81	66	51
Link Distance (ft)	530	228	203	262
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Network Summary

Network wide Queuing Penalty: 0

Appendix H

Existing Site Driveway Traffic Counts

Wells + Associates, Inc.

McLean, Virginia

Turning Movement Count - Total Vehicles

PROJECT: North West & West Broad	DATE: 9/12/2013	SOUTHBOUND ROAD: Site Driveway - A																					
W+A JOB NO: 5897	DAY: Thursday	NORTHBOUND ROAD: 0																					
INTERSECTION: W. Broad St. & Driveway A	WEATHER: clear	WESTBOUND ROAD: West Broad Street - 7																					
LOCATION: Fairfax County,VA	COUNTED BY: Eduvina	EASTBOUND ROAD: West Broad Street - 7																					
	INPUTED BY: agan																						
Time Period	Southbound Site Driveway - A					Westbound West Broad Street - 7					Northbound 0					Eastbound West Broad Street - 7					North & South	East & West	Total
	Right	Thru	Left	Total	PHF	Right	Thru	Left	Total	PHF	Right	Thru	Left	Total	PHF	Right	Thru	Left	Total	PHF			
15 Minute Volumes																							
6:00 AM - 6:15 AM																							
6:15 AM - 6:30 AM																							
6:30 AM - 6:45 AM																							
6:45 AM - 7:00 AM																							
7:00 AM - 7:15 AM																							
7:15 AM - 7:30 AM	I	I	I	I														2	2	I	3	4	
7:30 AM - 7:45 AM	3	I	4															3	3	4	3	7	
7:45 AM - 8:00 AM																							
8:00 AM - 8:15 AM																							
8:15 AM - 8:30 AM																							
8:30 AM - 8:45 AM																		2	2	2	2	2	
8:45 AM - 9:00 AM						I	I										2	2		3	3		
2:30 PM - 2:45 PM	5	I	6			2		2												6	2	8	
2:45 PM - 3:00 PM	9	I	10														I	I		10	I	11	
3:00 PM - 3:15 PM	I	I	I	I		4		4											I	4	5		
3:15 PM - 3:30 PM	3		3														I	I		3	I	4	
3:30 PM - 3:45 PM	I	I	I	I		I		I											I	I	2		
3:45 PM - 4:00 PM	3	I	4			I		I									2	2	4	3	7		
4:00 PM - 4:15 PM	3		3			I		I									3	3	3	4	7		
4:15 PM - 4:30 PM	I	I	I	I		I		I									I	I	I	2	3		
4:30 PM - 4:45 PM	2		2														I	I		2	I	3	
4:45 PM - 5:00 PM	I	I	I	I		2		2											I	2	3		
5:00 PM - 5:15 PM						2		2												2	2		
5:15 PM - 5:30 PM	5		5																	5	5		
5:30 PM - 5:45 PM	I	I	I	I		I		I											I	I	2		
5:45 PM - 6:00 PM	2		2			2		2											2	2	4		
6:00 PM - 6:15 PM	I	I	I	I		I		I											I	I	2		
6:15 PM - 6:30 PM						I		I											I	I	1		
6:30 PM - 6:45 PM	3	I	4			3		3											4	3	7		
6:45 PM - 7:00 PM	3		3			I		I										2	2	3	6		
Total	48	0	5	53		25	0	0	25		0	0	0	0		0	0	20	20		53	45	98
One Hour Volumes																							
6:00 AM - 7:00 AM																							
6:15 AM - 7:15 AM																							
6:30 AM - 7:30 AM	I	I	0.25			I	I	0.25									2	2	0.25	I	3	4	
6:45 AM - 7:45 AM	4	I	5	0.3125		I	I	0.25									5	5	0.4167	5	6	11	
7:00 AM - 8:00 AM	4	I	5	0.3125		I	I	0.25									5	5	0.4167	5	6	11	
7:15 AM - 8:15 AM	4	I	5	0.3125		I	I	0.25									5	5	0.4167	5	6	11	
7:30 AM - 8:30 AM	3	I	4	0.25												3	3	0.25	4	3	7		
7:45 AM - 8:45 AM																2	2	0.25	2	2	2		
8:00 AM - 9:00 AM						I	I	0.25								4	4	0.5	5	5	5		
2:30 PM - 3:30 PM	18	2	20	0.5		6		6	0.375								2	2	0.5	20	8	28	
2:45 PM - 3:45 PM	14	I	15	0.375		5		5	0.3125								2	2	0.5	15	7	22	
3:00 PM - 4:00 PM	8	I	9	0.5625		6		6	0.375								3	3	0.375	9	9	18	
3:15 PM - 4:15 PM	10	I	11	0.6875		3		3	0.75								6	6	0.5	11	9	20	
3:30 PM - 4:30 PM	8	I	9	0.5625		4		4	I								6	6	0.5	9	10	19	
3:45 PM - 4:45 PM	9	I	10	0.625		3		3	0.75								7	7	0.5833	10	10	20	
4:00 PM - 5:00 PM	7		7	0.5833		4		4	0.5								5	5	0.4167	7	9	16	
4:15 PM - 5:15 PM	4		4	0.5		5		5	0.625								2	2	0.5	4	7	11	
4:30 PM - 5:30 PM	8		8	0.4		4		4	0.5								I	I	0.25	8	5	13	
4:45 PM - 5:45 PM	7		7	0.35		5		5	0.625											7	5	12	
5:00 PM - 6:00 PM	8		8	0.4		5		5	0.625											8	5	13	
5:15 PM - 6:15 PM	9		9	0.45		4		4	0.5											9	4	13	
5:30 PM - 6:30 PM	4		4	0.5		5		5	0.625											4	5	9	
5:45 PM - 6:45 PM	6	I	7	0.4375		7		7	0.5833											7	7	14	
6:00 PM - 7:00 PM	7	I	8	0.5		6		6	0.5											2	2	0.25	
-																				8	8	16	

Wells + Associates, Inc.

McLean, Virginia

Turning Movement Count - Total Vehicles

Wells + Associates, Inc.

McLean, Virginia

Turning Movement Count - Total Vehicles

Wells + Associates, Inc.

McLean, Virginia

Turning Movement Count - Total Vehicles

PROJECT: North West & West Broad	DATE: 9/12/2013	SOUTHBOUND ROAD: Site Driveway - D																				
W+A JOB NO: 5897	DAY: Thursday	NORTHBOUND ROAD: 0																				
INTERSECTION: W. Broad St. & Driveway D	WEATHER: clear	WESTBOUND ROAD: West Broad Street - 7																				
LOCATION: Fairfax County,VA	COUNTED BY: Victor	EASTBOUND ROAD: West Broad Street - 7																				
	INPUTED BY: agan																					
Time Period	Southbound Site Driveway - D				Westbound West Broad Street - 7				Northbound 0				Eastbound West Broad Street - 7				North & South	East & West	Total			
	Right	Thru	Left	Total	PHF	Right	Thru	Left	Total	PHF	Right	Thru	Left	Total	PHF							
15 Minute Volumes																						
6:00 AM - 6:15 AM																						
6:15 AM - 6:30 AM																						
6:30 AM - 6:45 AM			I															I	I			
6:45 AM - 7:00 AM			I															I	I			
7:00 AM - 7:15 AM			4															4	4			
7:15 AM - 7:30 AM																						
7:30 AM - 7:45 AM			2															2	2			
7:45 AM - 8:00 AM			7															7	7			
8:00 AM - 8:15 AM	I	I	I															I	I			
8:15 AM - 8:30 AM	I	I																I	I			
8:30 AM - 8:45 AM	2	2																2	2			
8:45 AM - 9:00 AM			2															2	2			
2:30 PM - 2:45 PM	2	2	I															2	I			
2:45 PM - 3:00 PM			I															I	I			
3:00 PM - 3:15 PM	I	I																I	I			
3:15 PM - 3:30 PM																						
3:30 PM - 3:45 PM	I	I	I															I	I			
3:45 PM - 4:00 PM			2															2	2			
4:00 PM - 4:15 PM	I	I	5															I	5			
4:15 PM - 4:30 PM			I															I	I			
4:30 PM - 4:45 PM	I	I																I	I			
4:45 PM - 5:00 PM			I															I	I			
5:00 PM - 5:15 PM	I	I	I															I	I			
5:15 PM - 5:30 PM	3	3	I															3	I			
5:30 PM - 5:45 PM	I	I																I	I			
5:45 PM - 6:00 PM			I															I	I			
6:00 PM - 6:15 PM			3															3	3			
6:15 PM - 6:30 PM			I															I	I			
6:30 PM - 6:45 PM	3	3																3	3			
6:45 PM - 7:00 PM																						
Total	18	0	0	18		37	0	0	37		0	0	0	0		0	0	0	0	18	37	55
One Hour Volumes																						
6:00 AM - 7:00 AM			2			0.5														2	2	
6:15 AM - 7:15 AM			6			0.375													6	6		
6:30 AM - 7:30 AM			6			0.375													6	6		
6:45 AM - 7:45 AM			7			0.4375												7	7			
7:00 AM - 8:00 AM			13			0.4643												13	13			
7:15 AM - 8:15 AM	I	I	0.25	10		0.3571												I	10	11		
7:30 AM - 8:30 AM	2	2	0.5	10		0.3571												2	10	12		
7:45 AM - 8:45 AM	4	4	0.5	8		0.2857											4	8	12			
8:00 AM - 9:00 AM	4	4	0.5	3		0.375											4	3	7			
2:30 PM - 3:30 PM	3	3	0.375	2		0.5												3	2	5		
2:45 PM - 3:45 PM	2	2	0.5	2		0.5												2	2	4		
3:00 PM - 4:00 PM	2	2	0.5	3		0.375											2	3	5			
3:15 PM - 4:15 PM	2	2	0.5	8		0.4											2	8	10			
3:30 PM - 4:30 PM	2	2	0.5	9		0.45											2	9	11			
3:45 PM - 4:45 PM	2	2	0.5	8		0.4											2	8	10			
4:00 PM - 5:00 PM	2	2	0.5	7		0.35											2	7	9			
4:15 PM - 5:15 PM	2	2	0.5	3		0.75											2	3	5			
4:30 PM - 5:30 PM	5	5	0.4167	3		0.75											5	3	8			
4:45 PM - 5:45 PM	5	5	0.4167	3		0.75											5	3	8			
5:00 PM - 6:00 PM	5	5	0.4167	3		0.75											5	3	8			
5:15 PM - 6:15 PM	4	4	0.3333	5		0.4167											4	5	9			
5:30 PM - 6:30 PM	I	I	0.25	5		0.4167											I	5	6			
5:45 PM - 6:45 PM	3	3	0.25	5		0.4167											3	5	8			
6:00 PM - 7:00 PM	3	3	0.25	4		0.3333											3	4	7			

Wells + Associates, Inc.

McLean, Virginia

Turning Movement Count - Total Vehicles

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Turning Movement Count - Total Vehicles

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McLean, Virginia

Turning Movement Count - Total Vehicles

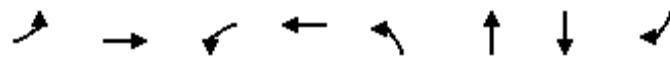
Appendix I

Total Future Conditions Synchro Analysis

Queues

1: Route 7 & N West St.

8/27/2014



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	318	1158	43	1148	257	344	194	167
V/c Ratio	1.57	0.80	0.24	0.88	0.78	1.01	0.70	0.35
Control Delay	299.4	29.8	22.3	47.4	63.9	98.0	60.6	19.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	299.4	29.8	22.3	47.4	63.9	98.0	60.6	19.9
Queue Length 50th (ft)	~305	439	18	501	191	~267	138	52
Queue Length 95th (ft)	#486	#595	m31	#621	#318	#465	217	112
Internal Link Dist (ft)		1468			216		431	110
Turn Bay Length (ft)	175		165			250		
Base Capacity (vph)	202	1442	226	1304	328	342	338	475
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.57	0.80	0.19	0.88	0.78	1.01	0.57	0.35

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

1: Route 7 & N West St.

8/27/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑		↑	↑↑		↑	↑		↑	↑	↑
Volume (vph)	293	1008	57	40	1034	22	236	272	44	73	106	154
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11	11	11	11	11	11	11
Total Lost time (s)	4.5	6.0		4.5	6.0		5.0	5.0			5.0	5.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00			1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Fr _t	1.00	0.99		1.00	1.00		1.00	0.98			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.98	1.00
Satd. Flow (prot)	1711	3239		1711	3251		1711	1759			1765	1531
Flt Permitted	0.08	1.00		0.12	1.00		0.95	1.00			0.98	1.00
Satd. Flow (perm)	151	3239		219	3251		1711	1759			1765	1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	318	1096	62	43	1124	24	257	296	48	79	115	167
RTOR Reduction (vph)	0	3	0	0	1	0	0	5	0	0	0	54
Lane Group Flow (vph)	318	1155	0	43	1147	0	257	339	0	0	194	113
Confl. Peds. (#/hr)	8		2	2		8	7		2	2		7
Heavy Vehicles (%)	2%	7%	2%	2%	7%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	4	0	0	0	0	0	0	0	0	0
Turn Type	pm+pt			pm+pt			Split			Split		pt+ov
Protected Phases	5	2		1	6		3	3		4	4	45
Permitted Phases				6								
Actuated Green, G (s)	62.0	52.5		53.2	48.1		23.0	23.0			18.9	33.4
Effective Green, g (s)	62.0	52.5		53.2	48.1		23.0	23.0			18.9	33.4
Actuated g/C Ratio	0.52	0.44		0.44	0.40		0.19	0.19			0.16	0.28
Clearance Time (s)	4.5	6.0		4.5	6.0		5.0	5.0			5.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0			2.0	
Lane Grp Cap (vph)	202	1417		161	1303		328	337			278	426
v/s Ratio Prot	c0.12	0.36		0.01	0.35		0.15	c0.19			c0.11	0.07
v/s Ratio Perm	c0.69			0.11								
v/c Ratio	1.57	0.82		0.27	0.88		0.78	1.01			0.70	0.26
Uniform Delay, d1	31.9	29.5		21.8	33.3		46.1	48.5			47.8	33.7
Progression Factor	0.80	0.82		1.25	1.17		1.00	1.00			1.00	1.00
Incremental Delay, d2	276.9	4.3		0.3	7.4		10.7	50.6			6.0	0.1
Delay (s)	302.4	28.6		27.5	46.2		56.9	99.1			53.9	33.9
Level of Service	F	C		C	D		E	F			D	C
Approach Delay (s)		87.6			45.6			81.1			44.6	
Approach LOS		F			D			F			D	
Intersection Summary												
HCM Average Control Delay		68.4			HCM Level of Service			E				
HCM Volume to Capacity ratio		1.30										
Actuated Cycle Length (s)		120.0			Sum of lost time (s)			19.0				
Intersection Capacity Utilization		91.4%			ICU Level of Service			F				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

2: Grove St. & N West St.

8/27/2014

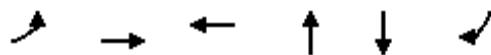


Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↑		↑	↑↓	
Volume (veh/h)	0	22	0	586	313	57
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	24	0	637	340	62
Pedestrians				1		
Lane Width (ft)				12.0		
Walking Speed (ft/s)				4.0		
Percent Blockage				0		
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				279	301	
pX, platoon unblocked	0.70					
vC, conflicting volume	1008	202	402			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	798	202	402			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	97	100			
cM capacity (veh/h)	227	804	1153			
Direction, Lane #	EB 1	NB 1	SB 1	SB 2		
Volume Total	24	637	227	175		
Volume Left	0	0	0	0		
Volume Right	24	0	0	62		
cSH	804	1700	1700	1700		
Volume to Capacity	0.03	0.37	0.13	0.10		
Queue Length 95th (ft)	2	0	0	0		
Control Delay (s)	9.6	0.0	0.0	0.0		
Lane LOS	A					
Approach Delay (s)	9.6	0.0	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay		0.2				
Intersection Capacity Utilization	41.2%		ICU Level of Service		A	
Analysis Period (min)		15				

Queues

3: N West St. & Park Ave.

8/27/2014



Lane Group	EBL	EBT	WBT	NBT	SBT	SBR
Lane Group Flow (vph)	454	175	311	91	48	162
v/c Ratio	0.80	0.17	0.94	0.18	0.10	0.26
Control Delay	41.8	8.5	77.2	22.9	20.5	2.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	41.8	8.5	77.2	22.9	20.5	2.1
Queue Length 50th (ft)	262	43	193	32	14	0
Queue Length 95th (ft)	330	58	#361	80	38	11
Internal Link Dist (ft)		221	207	103	71	
Turn Bay Length (ft)	100					
Base Capacity (vph)	797	1259	331	499	464	617
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.57	0.14	0.94	0.18	0.10	0.26

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

3: N West St. & Park Ave.

8/27/2014



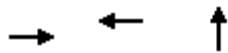
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↓			↔			↔		↑	↓	↔
Volume (vph)	418	133	28	9	232	45	42	15	27	34	10	149
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0			6.0			6.0		6.0	6.0	6.0
Lane Util. Factor	1.00	1.00			1.00			1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00			1.00			1.00		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00			1.00			1.00		1.00	1.00	1.00
Frt	1.00	0.97			0.98			0.96		1.00	0.85	
Flt Protected	0.95	1.00			1.00			0.98		0.96	1.00	
Satd. Flow (prot)	1770	1815			1820			1739		1786	1583	
Flt Permitted	0.95	1.00			0.99			0.85		0.78	1.00	
Satd. Flow (perm)	1770	1815			1799			1513		1449	1583	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	454	145	30	10	252	49	46	16	29	37	11	162
RTOR Reduction (vph)	0	11	0	0	7	0	0	14	0	0	0	110
Lane Group Flow (vph)	454	164	0	0	304	0	0	77	0	0	48	52
Confl. Peds. (#/hr)											2	
Turn Type	Prot			Perm			Perm			Perm		Perm
Protected Phases	3	8		4			2			6		
Permitted Phases			4				2			6		6
Actuated Green, G (s)	32.0	56.0		18.0			32.0			32.0		32.0
Effective Green, g (s)	32.0	56.0		18.0			32.0			32.0		32.0
Actuated g/C Ratio	0.32	0.56		0.18			0.32			0.32		0.32
Clearance Time (s)	6.0	6.0		6.0			6.0			6.0		6.0
Vehicle Extension (s)	3.0	5.0		5.0			3.0			3.0		3.0
Lane Grp Cap (vph)	566	1016		324			484			464		507
v/s Ratio Prot	c0.26	0.09										
v/s Ratio Perm			c0.17				c0.05			0.03		0.03
v/c Ratio	0.80	0.16		0.94			0.16			0.10		0.10
Uniform Delay, d1	31.1	10.6		40.5			24.4			23.9		23.9
Progression Factor	1.00	1.00		1.00			1.00			0.72		0.21
Incremental Delay, d2	8.0	0.2		35.1			0.7			0.1		0.1
Delay (s)	39.1	10.8		75.6			25.1			17.3		5.1
Level of Service	D	B		E			C			B		A
Approach Delay (s)		31.3		75.6			25.1			7.9		
Approach LOS		C		E			C			A		
Intersection Summary												
HCM Average Control Delay		38.0		HCM Level of Service			D					
HCM Volume to Capacity ratio		0.58										
Actuated Cycle Length (s)		100.0		Sum of lost time (s)			18.0					
Intersection Capacity Utilization		65.0%		ICU Level of Service			C					
Analysis Period (min)		15										

c Critical Lane Group

Queues

4: Route 7 & N Spring St.

8/27/2014



Lane Group	EBT	WBT	NBT
Lane Group Flow (vph)	1245	1264	111
V/c Ratio	0.63	0.60	0.32
Control Delay	20.3	8.9	19.6
Queue Delay	0.0	0.0	0.0
Total Delay	20.3	8.9	19.6
Queue Length 50th (ft)	480	103	31
Queue Length 95th (ft)	m555	240	61
Internal Link Dist (ft)	385	625	201
Turn Bay Length (ft)			
Base Capacity (vph)	1980	2102	539
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.63	0.60	0.21

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

4: Route 7 & N Spring St.

8/27/2014

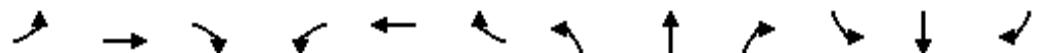


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	35	1088	22	14	1092	57	15	68	19	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11	12	15	12	12	12	12
Total Lost time (s)					6.0				6.0			
Lane Util. Factor		0.95				0.95			1.00			
Frpb, ped/bikes		1.00				1.00			1.00			
Flpb, ped/bikes		1.00				1.00			1.00			
Fr _t		1.00				0.99			0.97			
Flt Protected		1.00				1.00			0.99			
Satd. Flow (prot)		3253				3240			1969			
Flt Permitted		0.88				0.93			0.99			
Satd. Flow (perm)		2858				3027			1969			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	38	1183	24	15	1187	62	16	74	21	0	0	0
RTOR Reduction (vph)	0	2	0	0	5	0	0	16	0	0	0	0
Lane Group Flow (vph)	0	1243	0	0	1259	0	0	95	0	0	0	0
Confl. Peds. (#/hr)	10		13	13		10	15		9	9		15
Heavy Vehicles (%)	2%	7%	2%	2%	7%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	4	0	0	4	0	0	0	0	0	0
Turn Type	Perm			Perm			Perm					
Protected Phases		2			2			4				
Permitted Phases	2			2			4					
Actuated Green, G (s)	39.2			39.2			8.8					
Effective Green, g (s)	39.2			39.2			8.8					
Actuated g/C Ratio	0.65			0.65			0.15					
Clearance Time (s)	6.0			6.0			6.0					
Vehicle Extension (s)	1.5			1.5			2.0					
Lane Grp Cap (vph)	1867			1978			289					
v/s Ratio Prot												
v/s Ratio Perm	c0.44			0.42			0.05					
v/c Ratio	0.67			0.64			0.33					
Uniform Delay, d1	6.4			6.2			22.9					
Progression Factor	2.58			1.00			1.00					
Incremental Delay, d2	1.2			1.6			0.2					
Delay (s)	17.7			7.8			23.2					
Level of Service	B			A			C					
Approach Delay (s)	17.7			7.8			23.2			0.0		
Approach LOS	B			A			C			A		
Intersection Summary												
HCM Average Control Delay	13.1			HCM Level of Service			B					
HCM Volume to Capacity ratio	0.60											
Actuated Cycle Length (s)	60.0			Sum of lost time (s)			12.0					
Intersection Capacity Utilization	78.6%			ICU Level of Service			D					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

5: Park Ave. & N Spring St.

8/27/2014



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	14	174	0	0	201	30	31	43	95	20	0	18
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	15	189	0	0	218	33	34	47	103	22	0	20
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	204	251	184	41								
Volume Left (vph)	15	0	34	22								
Volume Right (vph)	0	33	103	20								
Hadj (s)	0.05	-0.04	-0.27	-0.14								
Departure Headway (s)	4.8	4.7	4.8	5.1								
Degree Utilization, x	0.27	0.33	0.24	0.06								
Capacity (veh/h)	697	726	690	617								
Control Delay (s)	9.7	10.0	9.3	8.5								
Approach Delay (s)	9.7	10.0	9.3	8.5								
Approach LOS	A	A	A	A								
Intersection Summary												
Delay					9.6							
HCM Level of Service					A							
Intersection Capacity Utilization					38.2%		ICU Level of Service					A
Analysis Period (min)					15							

Queues

6: Lincoln Ave. & N West St.

8/27/2014



Lane Group	EBT	WBT	NBT	NBR	SBT
Lane Group Flow (vph)	31	63	311	205	166
V/c Ratio	0.24	0.40	0.22	0.17	0.12
Control Delay	39.2	45.6	9.3	4.1	6.4
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	39.2	45.6	9.3	4.1	6.4
Queue Length 50th (ft)	14	34	67	0	35
Queue Length 95th (ft)	42	73	m143	m50	71
Internal Link Dist (ft)	413	1025	252		266
Turn Bay Length (ft)				150	
Base Capacity (vph)	328	480	1389	1176	1343
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.09	0.13	0.22	0.17	0.12

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

6: Lincoln Ave. & N West St.

8/27/2014



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	21	7	47	4	7	1	285	189	12	140	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0			6.0			6.0	6.0		6.0	
Lane Util. Factor		1.00			1.00			1.00	1.00		1.00	
Frpb, ped/bikes		0.98			1.00			1.00	0.97		1.00	
Flpb, ped/bikes		1.00			1.00			1.00	1.00		1.00	
Fr _t		0.97			0.98			1.00	0.85		1.00	
Flt Protected		1.00			0.96			1.00	1.00		1.00	
Satd. Flow (prot)		1769			1760			1862	1528		1852	
Flt Permitted		1.00			0.96			1.00	1.00		0.97	
Satd. Flow (perm)		1769			1760			1862	1528		1804	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	23	8	51	4	8	1	310	205	13	152	1
RTOR Reduction (vph)	0	8	0	0	6	0	0	0	62	0	0	0
Lane Group Flow (vph)	0	23	0	0	57	0	0	311	143	0	166	0
Confl. Peds. (#/hr)			4	4			12		21	21		12
Turn Type	Split			Split			Perm		Perm	Perm		
Protected Phases	1	1		3	3			2			2	
Permitted Phases							2		2	2		
Actuated Green, G (s)		4.7			7.6			69.7	69.7		69.7	
Effective Green, g (s)		4.7			7.6			69.7	69.7		69.7	
Actuated g/C Ratio		0.05			0.08			0.70	0.70		0.70	
Clearance Time (s)		6.0			6.0			6.0	6.0		6.0	
Vehicle Extension (s)		3.0			3.0			3.0	3.0		3.0	
Lane Grp Cap (vph)		83			134			1298	1065		1257	
v/s Ratio Prot	c0.01			c0.03								
v/s Ratio Perm							0.17	0.09		0.09		
v/c Ratio		0.28			0.42			0.24	0.13		0.13	
Uniform Delay, d1		46.0			44.1			5.5	5.1		5.1	
Progression Factor		1.00			1.00			1.39	3.24		1.00	
Incremental Delay, d2		1.9			2.1			0.4	0.2		0.2	
Delay (s)		47.9			46.2			8.0	16.6		5.3	
Level of Service		D			D			A	B		A	
Approach Delay (s)		47.9			46.2			11.4			5.3	
Approach LOS		D			D			B			A	
Intersection Summary												
HCM Average Control Delay		14.4			HCM Level of Service			B				
HCM Volume to Capacity ratio		0.26										
Actuated Cycle Length (s)		100.0			Sum of lost time (s)			18.0				
Intersection Capacity Utilization		46.6%			ICU Level of Service			A				
Analysis Period (min)		15										

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

7: W&OD Trail & Grove St.

8/27/2014



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	0	0	0	0	57	0	0	22	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	0	0	0	0	62	0	0	24	0
Pedestrians								25			31	
Lane Width (ft)								12.0			12.0	
Walking Speed (ft/s)								4.0			4.0	
Percent Blockage								2			3	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	117	86	49	111	86	93	24				62	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	117	86	49	111	86	93	24				62	
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1				4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2				2.2	
p0 queue free %	100	100	100	100	100	100	100				100	
cM capacity (veh/h)	837	804	998	849	804	939	1591				1541	
Direction, Lane #	NB 1	SB 1										
Volume Total	62	24										
Volume Left	0	0										
Volume Right	0	0										
cSH	1700	1700										
Volume to Capacity	0.04	0.01										
Queue Length 95th (ft)	0	0										
Control Delay (s)	0.0	0.0										
Lane LOS												
Approach Delay (s)	0.0	0.0										
Approach LOS												
Intersection Summary												
Average Delay		0.0										
Intersection Capacity Utilization		6.7%		ICU Level of Service					A			
Analysis Period (min)		15										

HCM Unsignalized Intersection Capacity Analysis

8: W&OD Trail & N West St.

8/27/2014



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	0	0	0	0	447	0	0	183	0
Sign Control		Stop			Stop				Free			Free
Grade		0%			0%				0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	0	0	0	0	486	0	0	199	0
Pedestrians								27			32	
Lane Width (ft)								12.0			12.0	
Walking Speed (ft/s)								4.0			4.0	
Percent Blockage								2			3	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								151			332	
pX, platoon unblocked												
vC, conflicting volume	717	685	226	712	685	518	199			486		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	717	685	226	712	685	518	199			486		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	100	100	100	100			100		
cM capacity (veh/h)	336	371	795	340	371	543	1373			1077		
Direction, Lane #	NB 1	SB 1										
Volume Total	486	199										
Volume Left	0	0										
Volume Right	0	0										
cSH	1700	1700										
Volume to Capacity	0.29	0.12										
Queue Length 95th (ft)	0	0										
Control Delay (s)	0.0	0.0										
Lane LOS												
Approach Delay (s)	0.0	0.0										
Approach LOS												
Intersection Summary												
Average Delay		0.0										
Intersection Capacity Utilization		26.9%			ICU Level of Service				A			
Analysis Period (min)		15										

Queues

9: Route 7 & Birch St.

8/27/2014



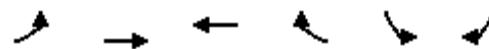
Lane Group	EBL	EBT	WBT	SBL
Lane Group Flow (vph)	82	1560	1545	105
v/c Ratio	0.35	0.60	0.67	0.45
Control Delay	8.5	8.0	9.8	42.2
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	8.5	8.0	9.8	42.2
Queue Length 50th (ft)	16	288	522	56
Queue Length 95th (ft)	30	351	630	111
Internal Link Dist (ft)		310	1468	305
Turn Bay Length (ft)	300			
Base Capacity (vph)	270	2586	2317	328
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.30	0.60	0.67	0.32

Intersection Summary

HCM Signalized Intersection Capacity Analysis

9: Route 7 & Birch St.

8/27/2014



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	75	1435	1357	64	61	36
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		6.0	
Lane Util. Factor	1.00	0.95	0.95		1.00	
Frpb, ped/bikes	1.00	1.00	1.00		0.98	
Flpb, ped/bikes	1.00	1.00	1.00		1.00	
Fr _t	1.00	1.00	0.99		0.95	
Fl _t Protected	0.95	1.00	1.00		0.97	
Satd. Flow (prot)	1770	3347	3353		1689	
Fl _t Permitted	0.11	1.00	1.00		0.97	
Satd. Flow (perm)	198	3347	3353		1689	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	82	1560	1475	70	66	39
RTOR Reduction (vph)	0	0	2	0	19	0
Lane Group Flow (vph)	82	1560	1543	0	86	0
Confl. Peds. (#/hr)	4			4	3	18
Heavy Vehicles (%)	2%	7%	7%	2%	2%	2%
Bus Blockages (#/hr)	0	4	0	0	0	0
Turn Type	pm+pt					
Protected Phases	5	2	6		4	
Permitted Phases	2					
Actuated Green, G (s)	92.7	92.7	81.7		15.3	
Effective Green, g (s)	92.7	92.7	81.7		15.3	
Actuated g/C Ratio	0.77	0.77	0.68		0.13	
Clearance Time (s)	6.0	6.0	6.0		6.0	
Vehicle Extension (s)	2.0	2.0	2.0		2.0	
Lane Grp Cap (vph)	218	2586	2283		215	
v/s Ratio Prot	0.02	c0.47	c0.46		c0.05	
v/s Ratio Perm	0.28					
v/c Ratio	0.38	0.60	0.68		0.40	
Uniform Delay, d1	8.9	5.8	11.3		48.1	
Progression Factor	1.00	1.00	0.69		1.00	
Incremental Delay, d2	0.4	1.1	0.9		0.4	
Delay (s)	9.3	6.9	8.7		48.6	
Level of Service	A	A	A		D	
Approach Delay (s)		7.0	8.7		48.6	
Approach LOS		A	A		D	
Intersection Summary						
HCM Average Control Delay		9.1	HCM Level of Service		A	
HCM Volume to Capacity ratio		0.65				
Actuated Cycle Length (s)		120.0	Sum of lost time (s)		18.0	
Intersection Capacity Utilization		70.1%	ICU Level of Service		C	
Analysis Period (min)		15				
c Critical Lane Group						

HCM Unsignalized Intersection Capacity Analysis

10: Route 7 & N Oak St.

8/27/2014



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	46	1162	11	15	1177	71	29	15	19	42	3	78
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	50	1263	12	16	1279	77	32	16	21	46	3	85
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)		705										
pX, platoon unblocked				0.82			0.82	0.82	0.82	0.82	0.82	
vC, conflicting volume	1357			1275			2128	2758	638	2111	2726	678
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1357			887			1931	2704	106	1911	2664	678
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	90			97			0	0	97	0	79	79
cM capacity (veh/h)	503			620			20	15	758	0	16	395
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1						
Volume Total	682	643	656	717	68	134						
Volume Left	50	0	16	0	32	46						
Volume Right	0	12	0	77	21	85						
cSH	503	1700	620	1700	25	0						
Volume to Capacity	0.10	0.38	0.03	0.42	2.73	Err						
Queue Length 95th (ft)	8	0	2	0	211	Err						
Control Delay (s)	2.8	0.0	0.7	0.0	1109.7	Err						
Lane LOS	A		A		F	F						
Approach Delay (s)	1.5		0.3		1109.7	Err						
Approach LOS					F	F						
Intersection Summary												
Average Delay							Err					
Intersection Capacity Utilization					81.2%		ICU Level of Service			D		
Analysis Period (min)					15							

HCM Unsignalized Intersection Capacity Analysis

11: Park Ave. & N Oak St.

8/27/2014



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	32	192	89	15	141	11	47	48	45	17	13	68
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	35	209	97	16	153	12	51	52	49	18	14	74
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	340	182	152	107								
Volume Left (vph)	35	16	51	18								
Volume Right (vph)	97	12	49	74								
Hadj (s)	-0.12	0.01	-0.09	-0.35								
Departure Headway (s)	4.7	5.1	5.3	5.1								
Degree Utilization, x	0.45	0.26	0.22	0.15								
Capacity (veh/h)	720	660	609	623								
Control Delay (s)	11.5	9.8	9.8	9.0								
Approach Delay (s)	11.5	9.8	9.8	9.0								
Approach LOS	B	A	A	A								
Intersection Summary												
Delay					10.5							
HCM Level of Service					B							
Intersection Capacity Utilization			44.4%			ICU Level of Service				A		
Analysis Period (min)					15							

HCM Unsignalized Intersection Capacity Analysis

12: RIRO & N West St.

8/27/2014



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↑	↑			↑↑
Volume (veh/h)	0	4	581	3	0	336
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	4	632	3	0	365
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			190			390
pX, platoon unblocked	0.69	0.69				0.69
vC, conflicting volume	816	633				635
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	515	252				254
tC, single (s)	6.8	6.9				4.1
tC, 2 stage (s)						
tF (s)	3.5	3.3				2.2
p0 queue free %	100	99				100
cM capacity (veh/h)	340	519				908
Direction, Lane #	WB 1	NB 1	SB 1	SB 2		
Volume Total	4	635	183	183		
Volume Left	0	0	0	0		
Volume Right	4	3	0	0		
cSH	519	1700	1700	1700		
Volume to Capacity	0.01	0.37	0.11	0.11		
Queue Length 95th (ft)	1	0	0	0		
Control Delay (s)	12.0	0.0	0.0	0.0		
Lane LOS	B					
Approach Delay (s)	12.0	0.0	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			0.1			
Intersection Capacity Utilization		40.8%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis

13: Route 7 & Mason Lane

8/27/2014



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑			↑
Volume (veh/h)	0	1158	1069	31	0	37
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	1259	1162	34	0	40
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)		296	655			
pX, platoon unblocked	0.81			0.79	0.81	
vC, conflicting volume	1196			1808	598	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	783			417	48	
tC, single (s)	4.1			6.8	6.9	
tC, 2 stage (s)						
tF (s)	2.2			3.5	3.3	
p0 queue free %	100			100	95	
cM capacity (veh/h)	676			443	822	
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	
Volume Total	629	629	775	421	40	
Volume Left	0	0	0	0	0	
Volume Right	0	0	0	34	40	
cSH	1700	1700	1700	1700	822	
Volume to Capacity	0.37	0.37	0.46	0.25	0.05	
Queue Length 95th (ft)	0	0	0	0	4	
Control Delay (s)	0.0	0.0	0.0	0.0	9.6	
Lane LOS					A	
Approach Delay (s)	0.0		0.0		9.6	
Approach LOS					A	
Intersection Summary						
Average Delay			0.2			
Intersection Capacity Utilization		40.5%		ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

14: Route 7 & Driveway

8/27/2014



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	19	1139	1093	15	10	8
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	21	1238	1188	16	11	9
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)		486	465			
pX, platoon unblocked	0.80			0.80	0.80	
vC, conflicting volume	1204			1857	602	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	744			416	0	
tC, single (s)	4.1			6.8	6.9	
tC, 2 stage (s)						
tF (s)	2.2			3.5	3.3	
p0 queue free %	97			98	99	
cM capacity (veh/h)	684			437	863	
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	
Volume Total	433	825	792	412	20	
Volume Left	21	0	0	0	11	
Volume Right	0	0	0	16	9	
cSH	684	1700	1700	1700	560	
Volume to Capacity	0.03	0.49	0.47	0.24	0.03	
Queue Length 95th (ft)	2	0	0	0	3	
Control Delay (s)	0.9	0.0	0.0	0.0	11.7	
Lane LOS	A			B		
Approach Delay (s)	0.3		0.0		11.7	
Approach LOS				B		
Intersection Summary						
Average Delay		0.2				
Intersection Capacity Utilization		55.0%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis

15: Park Ave. & Garage Entrance

8/27/2014



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑ ↗			↖ ↘	↖ ↗	
Volume (veh/h)	175	29	16	224	76	32
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	190	32	17	243	83	35
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		None			
Median storage (veh)						
Upstream signal (ft)	287					
pX, platoon unblocked		0.98		0.98	0.98	
vC, conflicting volume		222		484	206	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol		200		467	184	
tC, single (s)		4.1		6.4	6.2	
tC, 2 stage (s)						
tF (s)		2.2		3.5	3.3	
p0 queue free %		99		85	96	
cM capacity (veh/h)		1349		538	844	
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	222	261	117			
Volume Left	0	17	83			
Volume Right	32	0	35			
cSH	1700	1349	603			
Volume to Capacity	0.13	0.01	0.19			
Queue Length 95th (ft)	0	1	18			
Control Delay (s)	0.0	0.6	12.4			
Lane LOS		A	B			
Approach Delay (s)	0.0	0.6	12.4			
Approach LOS			B			
Intersection Summary						
Average Delay		2.7				
Intersection Capacity Utilization		37.8%		ICU Level of Service		A
Analysis Period (min)		15				

Queuing and Blocking Report

left turn lane at southern entrance removed

8/26/2014

Intersection: 3: N West St. & Park Ave.

Movement	EB	EB	WB	NB	SB	SB
Directions Served	L	TR	LTR	LTR	LT	R
Maximum Queue (ft)	125	284	175	72	43	79
Average Queue (ft)	95	116	81	37	21	33
95th Queue (ft)	141	268	153	60	34	59
Link Distance (ft)		269	741	131		76
Upstream Blk Time (%)		2			0	
Queuing Penalty (veh)		0			0	
Storage Bay Dist (ft)	100				50	
Storage Blk Time (%)	24	0			0	1
Queuing Penalty (veh)	39	1			0	0

Intersection: 5: Park Ave. & N Spring St.

Movement	EB	WB	NB	SB
Directions Served	LT	TR	LTR	LR
Maximum Queue (ft)	92	78	95	30
Average Queue (ft)	42	46	41	22
95th Queue (ft)	66	69	70	44
Link Distance (ft)	741	530	201	303
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 11: Park Ave. & N Oak St.

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	77	79	126	98
Average Queue (ft)	47	48	47	35
95th Queue (ft)	68	73	87	62
Link Distance (ft)	530	228	203	262
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Network Summary

Network wide Queuing Penalty: 41

Queues

1: Route 7 & N West St.

8/27/2014



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	318	1158	43	1148	257	344	79	115	167
V/c Ratio	1.52	0.79	0.23	0.86	0.78	1.01	0.31	0.43	0.36
Control Delay	276.9	28.6	21.8	45.3	63.9	98.0	46.9	50.0	20.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	276.9	28.6	21.8	45.3	63.9	98.0	46.9	50.0	20.3
Queue Length 50th (ft)	~298	439	18	501	191	~267	52	78	52
Queue Length 95th (ft)	#479	#595	m31	#621	#318	#465	99	135	112
Internal Link Dist (ft)		1468		216		431		110	
Turn Bay Length (ft)	175		165		250		70		
Base Capacity (vph)	209	1473	232	1335	328	342	328	345	461
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.52	0.79	0.19	0.86	0.78	1.01	0.24	0.33	0.36

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

1: Route 7 & N West St.

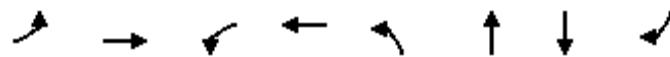
8/27/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑		↑	↑↑		↑	↑		↑	↑	↑
Volume (vph)	293	1008	57	40	1034	22	236	272	44	73	106	154
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11	11	11	11	11	11	11
Total Lost time (s)	4.5	6.0		4.5	6.0		5.0	5.0		5.0	5.0	5.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	1.00
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Fr _t	1.00	0.99		1.00	1.00		1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1711	3239		1711	3251		1711	1759		1711	1801	1531
Flt Permitted	0.09	1.00		0.13	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	161	3239		229	3251		1711	1759		1711	1801	1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	318	1096	62	43	1124	24	257	296	48	79	115	167
RTOR Reduction (vph)	0	3	0	0	1	0	0	5	0	0	0	55
Lane Group Flow (vph)	318	1155	0	43	1147	0	257	339	0	79	115	112
Confl. Peds. (#/hr)	8		2	2		8	7		2	2		7
Heavy Vehicles (%)	2%	7%	2%	2%	7%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	4	0	0	0	0	0	0	0	0	0
Turn Type	pm+pt		pm+pt				Split			Split		pt+ov
Protected Phases	5	2		1	6		3	3		4	4	45
Permitted Phases				6								
Actuated Green, G (s)	63.1	53.6		54.3	49.2		23.0	23.0		17.8	17.8	32.3
Effective Green, g (s)	63.1	53.6		54.3	49.2		23.0	23.0		17.8	17.8	32.3
Actuated g/C Ratio	0.53	0.45		0.45	0.41		0.19	0.19		0.15	0.15	0.27
Clearance Time (s)	4.5	6.0		4.5	6.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	207	1447		167	1333		328	337		254	267	412
v/s Ratio Prot	c0.12	0.36		0.01	0.35		0.15	c0.19		0.05	c0.06	0.07
v/s Ratio Perm	c0.68			0.11								
v/c Ratio	1.54	0.80		0.26	0.86		0.78	1.01		0.31	0.43	0.27
Uniform Delay, d1	30.4	28.6		21.0	32.3		46.1	48.5		45.6	46.5	34.6
Progression Factor	0.78	0.82		1.25	1.17		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	260.0	3.8		0.2	6.3		10.7	50.6		0.3	0.4	0.1
Delay (s)	283.8	27.2		26.5	43.9		56.9	99.1		45.9	46.9	34.7
Level of Service	F	C		C	D		E	F		D	D	C
Approach Delay (s)		82.5			43.3			81.1			41.0	
Approach LOS		F			D			F			D	
Intersection Summary												
HCM Average Control Delay		65.3					HCM Level of Service			E		
HCM Volume to Capacity ratio		1.24										
Actuated Cycle Length (s)		120.0					Sum of lost time (s)			19.0		
Intersection Capacity Utilization		88.1%					ICU Level of Service			E		
Analysis Period (min)				15								
c Critical Lane Group												

Queues

1: Route 7 & N West St.

8/27/2014



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	376	1337	99	1066	198	249	544	271
V/c Ratio	1.58	0.95	0.60	0.79	0.71	0.86	1.65	0.51
Control Delay	304.6	42.5	40.3	38.9	66.1	77.1	341.0	26.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	304.6	42.5	40.3	38.9	66.1	77.1	341.0	26.2
Queue Length 50th (ft)	~383	583	53	320	157	193	~665	114
Queue Length 95th (ft)	#598	#775	m107	433	241	#312	#887	204
Internal Link Dist (ft)		1468		216		431	110	
Turn Bay Length (ft)	175		165		250			
Base Capacity (vph)	238	1404	195	1347	316	328	329	535
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.58	0.95	0.51	0.79	0.63	0.76	1.65	0.51

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

1: Route 7 & N West St.

8/27/2014



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑		↑	↑↑		↑	↑		↑	↑	↑
Volume (vph)	346	1151	79	91	980	1	182	165	64	111	389	249
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11	11	11	11	11	11	11
Total Lost time (s)	4.5	6.0		4.5	6.0		5.0	5.0			5.0	5.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00			1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Fr _t	1.00	0.99		1.00	1.00		1.00	0.96			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.99	1.00
Satd. Flow (prot)	1711	3234		1711	3261		1711	1717			1781	1531
Flt Permitted	0.12	1.00		0.07	1.00		0.95	1.00			0.99	1.00
Satd. Flow (perm)	216	3234		134	3261		1711	1717			1781	1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	376	1251	86	99	1065	1	198	179	70	121	423	271
RTOR Reduction (vph)	0	3	0	0	0	0	0	11	0	0	0	72
Lane Group Flow (vph)	376	1334	0	99	1066	0	198	238	0	0	544	199
Confl. Peds. (#/hr)	8		2	2		8	7		2	2		7
Heavy Vehicles (%)	2%	7%	2%	2%	7%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	4	0	0	0	0	0	0	0	0	0
Turn Type	pm+pt			pm+pt			Split			Split		pt+ov
Protected Phases	5	2		1	6		3	3		4	4	45
Permitted Phases				6								
Actuated Green, G (s)	67.1	56.3		61.9	53.7		21.0	21.0			24.0	39.8
Effective Green, g (s)	67.1	56.3		61.9	53.7		21.0	21.0			24.0	39.8
Actuated g/C Ratio	0.52	0.43		0.48	0.41		0.16	0.16			0.18	0.31
Clearance Time (s)	4.5	6.0		4.5	6.0		5.0	5.0			5.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0			2.0	
Lane Grp Cap (vph)	236	1401		163	1347		276	277			329	469
v/s Ratio Prot	c0.13	0.41		0.04	0.33		0.12	c0.14			c0.31	0.13
v/s Ratio Perm	c0.69			0.25								
v/c Ratio	1.59	0.95		0.61	0.79		0.72	0.86			1.65	0.42
Uniform Delay, d1	27.6	35.5		26.2	33.3		51.7	53.1			53.0	36.0
Progression Factor	1.76	0.82		1.34	1.02		1.00	1.00			1.00	1.00
Incremental Delay, d2	281.4	12.1		3.5	3.9		7.2	21.6			307.3	0.2
Delay (s)	329.8	41.1		38.5	37.8		58.9	74.7			360.3	36.2
Level of Service	F	D		D	D		E	E			F	D
Approach Delay (s)		104.5			37.8			67.7			252.5	
Approach LOS		F			D			E			F	

Intersection Summary

HCM Average Control Delay	110.9	HCM Level of Service	F
HCM Volume to Capacity ratio	1.48		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	103.0%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis

2: Grove St. & N West St.

8/27/2014

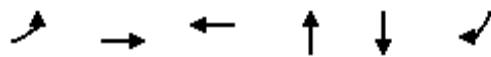


Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↑		↑	↑↓	
Volume (veh/h)	0	74	0	504	659	53
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	80	0	548	716	58
Pedestrians				1		
Lane Width (ft)				12.0		
Walking Speed (ft/s)				4.0		
Percent Blockage				0		
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				279	301	
pX, platoon unblocked	0.74					
vC, conflicting volume	1293	388	774			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1219	388	774			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	87	100			
cM capacity (veh/h)	127	610	837			
Direction, Lane #	EB 1	NB 1	SB 1	SB 2		
Volume Total	80	548	478	296		
Volume Left	0	0	0	0		
Volume Right	80	0	0	58		
cSH	610	1700	1700	1700		
Volume to Capacity	0.13	0.32	0.28	0.17		
Queue Length 95th (ft)	11	0	0	0		
Control Delay (s)	11.8	0.0	0.0	0.0		
Lane LOS	B					
Approach Delay (s)	11.8	0.0	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay		0.7				
Intersection Capacity Utilization		36.9%		ICU Level of Service		A
Analysis Period (min)		15				

Queues

3: N West St. & Park Ave.

8/27/2014



Lane Group	EBL	EBT	WBT	NBT	SBT	SBR
Lane Group Flow (vph)	333	207	265	68	70	535
V/c Ratio	0.76	0.23	0.83	0.11	0.13	0.56
Control Delay	45.5	12.5	61.4	17.0	17.7	4.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.6
Total Delay	45.5	12.5	61.4	17.0	17.7	5.5
Queue Length 50th (ft)	197	63	159	19	16	37
Queue Length 95th (ft)	264	88	#290	54	m34	63
Internal Link Dist (ft)		221	207	103	71	
Turn Bay Length (ft)	100					
Base Capacity (vph)	797	1258	327	618	555	951
Starvation Cap Reductn	0	0	0	0	0	153
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.42	0.16	0.81	0.11	0.13	0.67

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

3: N West St. & Park Ave.

8/27/2014



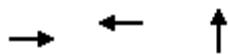
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑			↔			↔		↑	↔	↑
Volume (vph)	306	155	36	12	194	38	32	10	20	55	9	492
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0			6.0			6.0		6.0	6.0	6.0
Lane Util. Factor	1.00	1.00			1.00			1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00			1.00			1.00		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00			1.00			1.00		1.00	1.00	1.00
Frt	1.00	0.97			0.98			0.96		1.00	0.85	
Flt Protected	0.95	1.00			1.00			0.97		0.96	1.00	
Satd. Flow (prot)	1770	1810			1819			1737		1777	1583	
Flt Permitted	0.95	1.00			0.98			0.86		0.75	1.00	
Satd. Flow (perm)	1770	1810			1780			1526		1397	1583	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	333	168	39	13	211	41	35	11	22	60	10	535
RTOR Reduction (vph)	0	14	0	0	7	0	0	13	0	0	0	323
Lane Group Flow (vph)	333	193	0	0	258	0	0	55	0	0	70	212
Confl. Peds. (#/hr)											2	
Turn Type	Prot			Perm			Perm			Perm		Perm
Protected Phases	3	8		4			2			6		
Permitted Phases			4				2			6		6
Actuated Green, G (s)	24.8	48.3		17.5			39.7			39.7		39.7
Effective Green, g (s)	24.8	48.3		17.5			39.7			39.7		39.7
Actuated g/C Ratio	0.25	0.48		0.18			0.40			0.40		0.40
Clearance Time (s)	6.0	6.0		6.0			6.0			6.0		6.0
Vehicle Extension (s)	3.0	5.0		5.0			3.0			3.0		3.0
Lane Grp Cap (vph)	439	874		312			606			555		628
v/s Ratio Prot	c0.19	0.11										
v/s Ratio Perm				c0.15			0.04			0.05		c0.13
v/c Ratio	0.76	0.22		0.83			0.09			0.13		0.34
Uniform Delay, d1	34.8	15.0		39.8			18.9			19.1		21.0
Progression Factor	1.00	1.00		1.00			1.00			0.77		1.12
Incremental Delay, d2	7.4	0.3		18.1			0.3			0.1		0.3
Delay (s)	42.2	15.2		57.9			19.2			14.8		23.8
Level of Service	D	B		E			B			B		C
Approach Delay (s)		31.9		57.9			19.2			22.8		
Approach LOS		C		E			B			C		
Intersection Summary												
HCM Average Control Delay		32.2		HCM Level of Service			C					
HCM Volume to Capacity ratio		0.57										
Actuated Cycle Length (s)		100.0		Sum of lost time (s)			18.0					
Intersection Capacity Utilization		62.2%		ICU Level of Service			B					
Analysis Period (min)		15										

c Critical Lane Group

Queues

4: Route 7 & N Spring St.

8/27/2014



Lane Group	EBT	WBT	NBT
Lane Group Flow (vph)	1507	1409	44
v/c Ratio	0.62	0.62	0.24
Control Delay	4.6	6.0	33.5
Queue Delay	0.0	0.0	0.0
Total Delay	4.6	6.0	33.5
Queue Length 50th (ft)	55	226	16
Queue Length 95th (ft)	m74	284	54
Internal Link Dist (ft)	385	625	201
Turn Bay Length (ft)			
Base Capacity (vph)	2445	2269	398
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.62	0.62	0.11

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

4: Route 7 & N Spring St.

8/27/2014



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	26	1350	11	37	1197	63	10	9	21	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11	12	15	12	12	12	12
Total Lost time (s)					6.0	6.0			6.0			
Lane Util. Factor		0.95				0.95			1.00			
Frpb, ped/bikes		1.00				1.00			0.98			
Flpb, ped/bikes		1.00				1.00			0.99			
Fr _t		1.00				0.99			0.93			
Flt Protected		1.00				1.00			0.99			
Satd. Flow (prot)		3256				3235			1829			
Flt Permitted		0.89				0.83			0.99			
Satd. Flow (perm)		2888				2678			1829			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	28	1467	12	40	1301	68	11	10	23	0	0	0
RTOR Reduction (vph)	0	0	0	0	2	0	0	21	0	0	0	0
Lane Group Flow (vph)	0	1507	0	0	1407	0	0	23	0	0	0	0
Confl. Peds. (#/hr)	10		13	13		10	15		9	9		15
Heavy Vehicles (%)	2%	7%	2%	2%	7%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	4	0	0	4	0	0	0	0	0	0
Turn Type	Perm			Perm			Perm					
Protected Phases		2			2			4				
Permitted Phases	2			2			4					
Actuated Green, G (s)	107.6			107.6			10.4					
Effective Green, g (s)	107.6			107.6			10.4					
Actuated g/C Ratio	0.83			0.83			0.08					
Clearance Time (s)	6.0			6.0			6.0					
Vehicle Extension (s)	1.5			1.5			2.0					
Lane Grp Cap (vph)	2390			2217			146					
v/s Ratio Prot												
v/s Ratio Perm	0.52			c0.53			0.01					
v/c Ratio	0.63			0.63			0.16					
Uniform Delay, d1	4.0			4.1			55.7					
Progression Factor	0.89			1.00			1.00					
Incremental Delay, d2	0.4			1.4			0.2					
Delay (s)	4.0			5.5			55.9					
Level of Service	A			A			E					
Approach Delay (s)	4.0			5.5			55.9		0.0			
Approach LOS	A			A			E		A			
Intersection Summary												
HCM Average Control Delay	5.5			HCM Level of Service			A					
HCM Volume to Capacity ratio	0.59											
Actuated Cycle Length (s)	130.0			Sum of lost time (s)			12.0					
Intersection Capacity Utilization	82.3%			ICU Level of Service			E					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

5: Park Ave. & N Spring St.

8/27/2014



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Sign Control		Stop			Stop			Stop			Stop		
Volume (vph)	18	193	0	0	196	9	38	18	36	20	0	18	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Hourly flow rate (vph)	20	210	0	0	213	10	41	20	39	22	0	20	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1									
Volume Total (vph)	229	223	100	41									
Volume Left (vph)	20	0	41	22									
Volume Right (vph)	0	10	39	20									
Hadj (s)	0.05	0.01	-0.12	-0.14									
Departure Headway (s)	4.6	4.5	4.9	5.0									
Degree Utilization, x	0.29	0.28	0.14	0.06									
Capacity (veh/h)	758	757	670	647									
Control Delay (s)	9.4	9.3	8.7	8.3									
Approach Delay (s)	9.4	9.3	8.7	8.3									
Approach LOS	A	A	A	A									
Intersection Summary													
Delay	9.2												
HCM Level of Service	A												
Intersection Capacity Utilization	39.6%		ICU Level of Service				A						
Analysis Period (min)	15												

Queues

6: Lincoln Ave. & N West St.

8/27/2014



Lane Group	EBT	WBT	NBT	NBR	SBT
Lane Group Flow (vph)	48	204	260	123	434
V/c Ratio	0.15	0.38	0.40	0.20	0.67
Control Delay	29.9	29.5	26.2	14.1	33.6
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	29.9	29.5	26.2	14.1	33.6
Queue Length 50th (ft)	20	101	165	46	232
Queue Length 95th (ft)	52	165	m232	m92	343
Internal Link Dist (ft)	413	1025	252		266
Turn Bay Length (ft)				150	
Base Capacity (vph)	323	542	649	614	645
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.15	0.38	0.40	0.20	0.67

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

6: Lincoln Ave. & N West St.

8/27/2014



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	34	10	170	11	6	8	231	113	20	378	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5			5.5			5.5	5.5		5.5	
Lane Util. Factor	1.00				1.00			1.00	1.00		1.00	
Frpb, ped/bikes	0.99				1.00			1.00	0.95		1.00	
Flpb, ped/bikes	1.00				1.00			1.00	1.00		1.00	
Fr _t	0.97				1.00			1.00	0.85		1.00	
Flt Protected	1.00				0.96			1.00	1.00		1.00	
Satd. Flow (prot)	1792				1774			1859	1506		1856	
Flt Permitted	1.00				0.96			0.98	1.00		0.98	
Satd. Flow (perm)	1792				1774			1830	1506		1815	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	37	11	185	12	7	9	251	123	22	411	1
RTOR Reduction (vph)	0	9	0	0	1	0	0	0	79	0	0	0
Lane Group Flow (vph)	0	39	0	0	203	0	0	260	44	0	434	0
Confl. Peds. (#/hr)			4	4			12		21	21		12
Turn Type	Split			Split			Perm		Perm	Perm		
Protected Phases	1	1		3	3			2			2	
Permitted Phases							2		2	2		
Actuated Green, G (s)	17.5				30.5			35.5	35.5		35.5	
Effective Green, g (s)	17.5				30.5			35.5	35.5		35.5	
Actuated g/C Ratio	0.18				0.30			0.36	0.36		0.36	
Clearance Time (s)	5.5				5.5			5.5	5.5		5.5	
Lane Grp Cap (vph)	314				541			650	535		644	
v/s Ratio Prot	c0.02				c0.11							
v/s Ratio Perm							0.14	0.03		c0.24		
v/c Ratio	0.12				0.37			0.40	0.08		0.67	
Uniform Delay, d1	34.8				27.3			24.2	21.4		27.3	
Progression Factor	1.00				1.00			0.99	3.13		1.00	
Incremental Delay, d2	0.8				2.0			1.7	0.3		5.6	
Delay (s)	35.6				29.2			25.7	67.4		32.9	
Level of Service	D				C			C	E		C	
Approach Delay (s)	35.6				29.2			39.1			32.9	
Approach LOS	D				C			D			C	
Intersection Summary												
HCM Average Control Delay	34.5				HCM Level of Service			C				
HCM Volume to Capacity ratio	0.45											
Actuated Cycle Length (s)	100.0				Sum of lost time (s)			16.5				
Intersection Capacity Utilization	62.5%				ICU Level of Service			B				
Analysis Period (min)	15											
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

7: W&OD Trail & Grove St.

8/27/2014

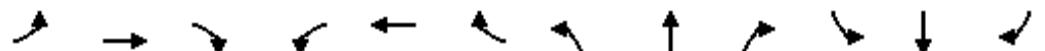


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	0	0	0	0	53	0	0	74	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	0	0	0	0	58	0	0	80	0
Pedestrians								25			31	
Lane Width (ft)								12.0			12.0	
Walking Speed (ft/s)								4.0			4.0	
Percent Blockage								2			3	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	169	138	105	163	138	89	80				58	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	169	138	105	163	138	89	80				58	
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1				4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2				2.2	
p0 queue free %	100	100	100	100	100	100	100				100	
cM capacity (veh/h)	774	753	929	785	753	944	1517				1547	
Direction, Lane #	NB 1	SB 1										
Volume Total	58	80										
Volume Left	0	0										
Volume Right	0	0										
cSH	1700	1700										
Volume to Capacity	0.03	0.05										
Queue Length 95th (ft)	0	0										
Control Delay (s)	0.0	0.0										
Lane LOS												
Approach Delay (s)	0.0	0.0										
Approach LOS												
Intersection Summary												
Average Delay		0.0										
Intersection Capacity Utilization		7.2%		ICU Level of Service					A			
Analysis Period (min)		15										

HCM Unsignalized Intersection Capacity Analysis

8: W&OD Trail & N West St.

8/27/2014



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	0	0	0	0	331	0	0	527	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	0	0	0	0	360	0	0	573	0
Pedestrians								27			32	
Lane Width (ft)								12.0			12.0	
Walking Speed (ft/s)								4.0			4.0	
Percent Blockage								2			3	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								151			332	
pX, platoon unblocked	0.81	0.81	0.81	0.81	0.81	0.81	0.81					
vC, conflicting volume	965	933	600	960	933	392	573				360	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	840	800	389	833	800	392	356				360	
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1				4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2				2.2	
p0 queue free %	100	100	100	100	100	100	100				100	
cM capacity (veh/h)	225	258	522	228	258	639	975				1199	
Direction, Lane #	NB 1	SB 1										
Volume Total	360	573										
Volume Left	0	0										
Volume Right	0	0										
cSH	1700	1700										
Volume to Capacity	0.21	0.34										
Queue Length 95th (ft)	0	0										
Control Delay (s)	0.0	0.0										
Lane LOS												
Approach Delay (s)	0.0	0.0										
Approach LOS												
Intersection Summary												
Average Delay			0.0									
Intersection Capacity Utilization			31.1%			ICU Level of Service					A	
Analysis Period (min)			15									

Queues

9: Route 7 & Birch St.

8/27/2014



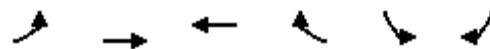
Lane Group	EBL	EBT	WBT	SBL
Lane Group Flow (vph)	103	1733	1396	193
v/c Ratio	0.39	0.68	0.62	0.75
Control Delay	8.8	9.9	25.1	64.5
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	8.8	9.9	25.1	64.5
Queue Length 50th (ft)	21	355	461	138
Queue Length 95th (ft)	41	490	600	214
Internal Link Dist (ft)		310	1468	305
Turn Bay Length (ft)	300			
Base Capacity (vph)	351	2562	2237	406
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.29	0.68	0.62	0.48

Intersection Summary

HCM Signalized Intersection Capacity Analysis

9: Route 7 & Birch St.

8/27/2014



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	95	1594	1213	72	111	66
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		6.0	
Lane Util. Factor	1.00	0.95	0.95		1.00	
Frpb, ped/bikes	1.00	1.00	1.00		0.98	
Flpb, ped/bikes	1.00	1.00	1.00		1.00	
Fr _t	1.00	1.00	0.99		0.95	
Fl _t Protected	0.95	1.00	1.00		0.97	
Satd. Flow (prot)	1770	3347	3348		1687	
Fl _t Permitted	0.13	1.00	1.00		0.97	
Satd. Flow (perm)	244	3347	3348		1687	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	103	1733	1318	78	121	72
RTOR Reduction (vph)	0	0	2	0	18	0
Lane Group Flow (vph)	103	1733	1394	0	175	0
Confl. Peds. (#/hr)	4			4	3	18
Heavy Vehicles (%)	2%	7%	7%	2%	2%	2%
Bus Blockages (#/hr)	0	4	0	0	0	0
Turn Type	pm+pt					
Protected Phases	5	2	6		4	
Permitted Phases	2					
Actuated Green, G (s)	99.5	99.5	86.8		18.5	
Effective Green, g (s)	99.5	99.5	86.8		18.5	
Actuated g/C Ratio	0.77	0.77	0.67		0.14	
Clearance Time (s)	6.0	6.0	6.0		6.0	
Vehicle Extension (s)	2.0	2.0	2.0		2.0	
Lane Grp Cap (vph)	265	2562	2235		240	
v/s Ratio Prot	0.02	c0.52	0.42		c0.10	
v/s Ratio Perm	0.28					
v/c Ratio	0.39	0.68	0.62		0.73	
Uniform Delay, d1	8.6	7.4	12.3		53.4	
Progression Factor	1.00	1.00	1.79		1.00	
Incremental Delay, d2	0.3	1.5	0.9		9.0	
Delay (s)	8.9	8.9	22.9		62.4	
Level of Service	A	A	C		E	
Approach Delay (s)		8.9	22.9		62.4	
Approach LOS		A	C		E	
Intersection Summary						
HCM Average Control Delay		17.6	HCM Level of Service		B	
HCM Volume to Capacity ratio		0.68				
Actuated Cycle Length (s)		130.0	Sum of lost time (s)		12.0	
Intersection Capacity Utilization		70.0%	ICU Level of Service		C	
Analysis Period (min)		15				
c Critical Lane Group						

HCM Unsignalized Intersection Capacity Analysis

10: Route 7 & N Oak St.

8/27/2014



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	31	1446	31	28	1338	43	10	7	35	37	6	78
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	34	1572	34	30	1454	47	11	8	38	40	7	85
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)		705										
pX, platoon unblocked				0.85			0.85	0.85	0.85	0.85	0.85	
vC, conflicting volume	1501			1605			2532	3218	803	2434	3211	751
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1501			1353			2448	3257	406	2331	3250	751
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	92			93			0	0	92	0	2	76
cM capacity (veh/h)	442			427			1	7	504	0	7	354
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1						
Volume Total	820	820	758	774	57	132						
Volume Left	34	0	30	0	11	40						
Volume Right	0	34	0	47	38	85						
cSH	442	1700	427	1700	4	0						
Volume to Capacity	0.08	0.48	0.07	0.46	15.75	Err						
Queue Length 95th (ft)	6	0	6	0	Err	Err						
Control Delay (s)	2.4	0.0	2.2	0.0	Err	Err						
Lane LOS	A		A		F	F						
Approach Delay (s)	1.2		1.1		Err	Err						
Approach LOS					F	F						
Intersection Summary												
Average Delay				Err								
Intersection Capacity Utilization		81.4%			ICU Level of Service				D			
Analysis Period (min)		15										

HCM Unsignalized Intersection Capacity Analysis

11: Park Ave. & N Oak St.

8/27/2014



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	17	190	66	19	204	14	11	27	56	35	24	11
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	18	207	72	21	222	15	12	29	61	38	26	12
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	297	258	102	76								
Volume Left (vph)	18	21	12	38								
Volume Right (vph)	72	15	61	12								
Hadj (s)	-0.10	0.01	-0.30	0.04								
Departure Headway (s)	4.6	4.8	5.0	5.4								
Degree Utilization, x	0.38	0.34	0.14	0.11								
Capacity (veh/h)	741	719	627	588								
Control Delay (s)	10.4	10.2	8.9	9.1								
Approach Delay (s)	10.4	10.2	8.9	9.1								
Approach LOS	B	B	A	A								
Intersection Summary												
Delay					10.0							
HCM Level of Service					A							
Intersection Capacity Utilization			35.6%			ICU Level of Service				A		
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis

12: RIRO & N West St.

8/27/2014



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↑	↑			↑↑
Volume (veh/h)	0	3	501	1	0	737
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	3	545	1	0	801
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)			190			390
pX, platoon unblocked	0.73	0.73				0.73
vC, conflicting volume	946	545				546
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	737	186				187
tC, single (s)	6.8	6.9				4.1
tC, 2 stage (s)						
tF (s)	3.5	3.3				2.2
p0 queue free %	100	99				100
cM capacity (veh/h)	257	599				1006
Direction, Lane #	WB 1	NB 1	SB 1	SB 2		
Volume Total	3	546	401	401		
Volume Left	0	0	0	0		
Volume Right	3	1	0	0		
cSH	599	1700	1700	1700		
Volume to Capacity	0.01	0.32	0.24	0.24		
Queue Length 95th (ft)	0	0	0	0		
Control Delay (s)	11.0	0.0	0.0	0.0		
Lane LOS	B					
Approach Delay (s)	11.0	0.0	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			0.0			
Intersection Capacity Utilization		36.4%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis

13: Route 7 & Mason Lane

8/27/2014

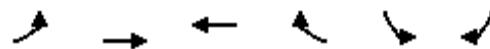


Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑			↑
Volume (veh/h)	0	1397	1160	43	0	28
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	1518	1261	47	0	30
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)		296	655			
pX, platoon unblocked	0.88			0.66	0.88	
vC, conflicting volume	1308			2043	654	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1076			745	333	
tC, single (s)	4.1			6.8	6.9	
tC, 2 stage (s)						
tF (s)	2.2			3.5	3.3	
p0 queue free %	100			100	95	
cM capacity (veh/h)	566			232	583	
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	
Volume Total	759	759	841	467	30	
Volume Left	0	0	0	0	0	
Volume Right	0	0	0	47	30	
cSH	1700	1700	1700	1700	583	
Volume to Capacity	0.45	0.45	0.49	0.27	0.05	
Queue Length 95th (ft)	0	0	0	0	4	
Control Delay (s)	0.0	0.0	0.0	0.0	11.5	
Lane LOS					B	
Approach Delay (s)	0.0		0.0		11.5	
Approach LOS					B	
Intersection Summary						
Average Delay			0.1			
Intersection Capacity Utilization		43.4%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis

14: Route 7 & Driveway

8/27/2014



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↖	
Volume (veh/h)	14	1383	1197	10	8	6
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	15	1503	1301	11	9	7
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)		486	465			
pX, platoon unblocked	0.87			0.67	0.87	
vC, conflicting volume	1312			2089	656	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1069			792	318	
tC, single (s)	4.1			6.8	6.9	
tC, 2 stage (s)						
tF (s)	2.2			3.5	3.3	
p0 queue free %	97			96	99	
cM capacity (veh/h)	566			213	592	
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	
Volume Total	516	1002	867	445	15	
Volume Left	15	0	0	0	9	
Volume Right	0	0	0	11	7	
cSH	566	1700	1700	1700	293	
Volume to Capacity	0.03	0.59	0.51	0.26	0.05	
Queue Length 95th (ft)	2	0	0	0	4	
Control Delay (s)	0.8	0.0	0.0	0.0	18.0	
Lane LOS	A			C		
Approach Delay (s)	0.3		0.0		18.0	
Approach LOS				C		
Intersection Summary						
Average Delay			0.2			
Intersection Capacity Utilization		58.1%		ICU Level of Service		B
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis

15: Park Ave. & Garage Entrance

8/27/2014



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑ ↗			↗ ↙	↖ ↗	
Volume (veh/h)	181	58	33	209	52	22
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	197	63	36	227	57	24
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		None			
Median storage (veh)						
Upstream signal (ft)	287					
pX, platoon unblocked		0.96		0.96	0.96	
vC, conflicting volume		260		527	228	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol		209		487	176	
tC, single (s)		4.1		6.4	6.2	
tC, 2 stage (s)						
tF (s)		2.2		3.5	3.3	
p0 queue free %		97		89	97	
cM capacity (veh/h)		1308		504	833	
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	260	263	80			
Volume Left	0	36	57			
Volume Right	63	0	24			
cSH	1700	1308	571			
Volume to Capacity	0.15	0.03	0.14			
Queue Length 95th (ft)	0	2	12			
Control Delay (s)	0.0	1.3	12.3			
Lane LOS		A	B			
Approach Delay (s)	0.0	1.3	12.3			
Approach LOS			B			
Intersection Summary						
Average Delay		2.2				
Intersection Capacity Utilization		40.1%		ICU Level of Service		A
Analysis Period (min)		15				

Queuing and Blocking Report

left turn lane at southern entrance removed

8/26/2014

Intersection: 3: N West St. & Park Ave.

Movement	EB	EB	WB	NB	SB	SB	B8
Directions Served	L	TR	LTR	LTR	LT	R	T
Maximum Queue (ft)	124	99	136	55	68	168	248
Average Queue (ft)	62	52	54	28	42	117	33
95th Queue (ft)	101	81	90	57	88	182	131
Link Distance (ft)		269	741	131		76	996
Upstream Blk Time (%)					1	28	
Queuing Penalty (veh)					0	0	
Storage Bay Dist (ft)	100				50		
Storage Blk Time (%)	2	0			1	39	
Queuing Penalty (veh)	4	0			3	25	

Intersection: 5: Park Ave. & N Spring St.

Movement	EB	WB	NB	SB
Directions Served	LT	TR	LTR	LR
Maximum Queue (ft)	93	72	70	54
Average Queue (ft)	38	41	31	21
95th Queue (ft)	62	61	55	46
Link Distance (ft)	741	530	201	303
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 11: Park Ave. & N Oak St.

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	92	115	56	55
Average Queue (ft)	47	53	33	30
95th Queue (ft)	72	85	45	53
Link Distance (ft)	530	228	203	262
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Network Summary

Network wide Queuing Penalty: 31

Queues

1: Route 7 & N West St.

8/27/2014



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	376	1337	99	1066	198	249	121	423	271
V/c Ratio	1.15	0.95	0.60	0.97	0.71	0.86	0.38	1.27	0.42
Control Delay	135.1	42.5	37.3	60.5	65.9	76.8	50.6	187.5	19.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	135.1	42.5	37.3	60.5	65.9	76.8	50.6	187.5	19.9
Queue Length 50th (ft)	~317	583	46	~418	157	193	91	~450	99
Queue Length 95th (ft)	#527	#775	m100	#636	241	#312	152	#656	178
Internal Link Dist (ft)	1468			216		431		110	
Turn Bay Length (ft)	175		165		250		70		
Base Capacity (vph)	327	1404	195	1102	316	328	316	332	643
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.15	0.95	0.51	0.97	0.63	0.76	0.38	1.27	0.42

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

1: Route 7 & N West St.

8/27/2014

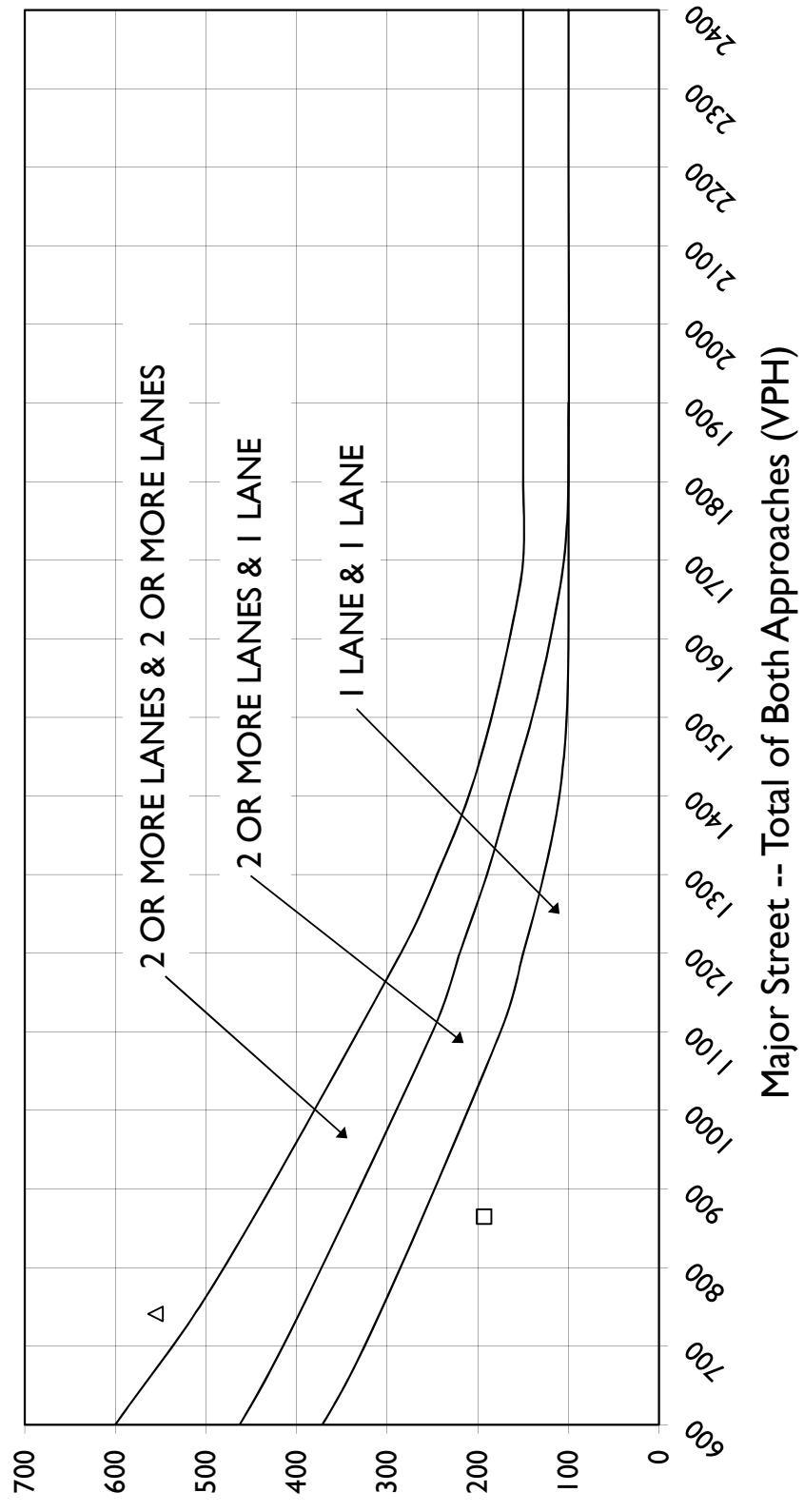
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑		↑	↑↑		↑	↑		↑	↑	↑
Volume (vph)	346	1151	79	91	980	1	182	165	64	111	389	249
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11	11	11	11	11	11	11
Total Lost time (s)	4.5	6.0		4.5	6.0		5.0	5.0		5.0	5.0	5.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Fr _t	1.00	0.99		1.00	1.00		1.00	0.96		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1711	3234		1711	3261		1711	1717		1711	1801	1531
Flt Permitted	0.08	1.00		0.09	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	149	3234		164	3261		1711	1717		1711	1801	1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	376	1251	86	99	1065	1	198	179	70	121	423	271
RTOR Reduction (vph)	0	3	0	0	0	0	0	11	0	0	0	66
Lane Group Flow (vph)	376	1334	0	99	1066	0	198	238	0	121	423	205
Confl. Peds. (#/hr)	8		2	2		8	7		2	2		7
Heavy Vehicles (%)	2%	7%	2%	2%	7%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	4	0	0	0	0	0	0	0	0	0
Turn Type	pm+pt		pm+pt				Split			Split		pt+ov
Protected Phases	5	2		1	6		3	3		4	4	45
Permitted Phases				6								
Actuated Green, G (s)	68.9	56.3		52.0	43.9		21.1	21.1		24.0	24.0	49.5
Effective Green, g (s)	68.9	56.3		52.0	43.9		21.1	21.1		24.0	24.0	49.5
Actuated g/C Ratio	0.53	0.43		0.40	0.34		0.16	0.16		0.18	0.18	0.38
Clearance Time (s)	4.5	6.0		4.5	6.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	325	1401		162	1101		278	279		316	332	583
v/s Ratio Prot	c0.18	0.41		0.04	0.33		0.12	c0.14		0.07	c0.23	0.13
v/s Ratio Perm	c0.43			0.21								
v/c Ratio	1.16	0.95		0.61	0.97		0.71	0.85		0.38	1.27	0.35
Uniform Delay, d1	41.7	35.5		28.9	42.4		51.6	52.9		46.5	53.0	28.8
Progression Factor	1.34	0.82		1.11	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	93.5	12.1		3.8	17.8		7.0	20.8		0.3	144.8	0.1
Delay (s)	149.4	41.1		35.9	60.3		58.6	73.8		46.8	197.8	28.9
Level of Service	F	D		D	E		E	E		D	F	C
Approach Delay (s)		64.9			58.2			67.0			119.2	
Approach LOS		E			E			E			F	
Intersection Summary												
HCM Average Control Delay		73.9					HCM Level of Service			E		
HCM Volume to Capacity ratio		1.09										
Actuated Cycle Length (s)		130.0					Sum of lost time (s)			14.5		
Intersection Capacity Utilization		93.9%					ICU Level of Service			F		
Analysis Period (min)				15								
c Critical Lane Group												

Appendix J

Peak Hour Signal Warrant Analysis
Manual of Uniform Traffic Control Devices (MUTCD)

INPUT VOLUMES

Condition	major street (total of both approaches)	minor street (high volume approach)	Lane Configuration	Yes/No Warrant Met
<input type="checkbox"/> TF AM Peak Hour	865	193	&	YES
<input type="triangle"/> TF PM Peak Hour	741	556	&	YES

Peak Hour Volume Warrant
N West St & Park Ave

Source: Manual on Uniform Traffic Control Devices 2009 Edition